

**APPENDIX H:
TRANSPORTATION IMPACT ANALYSIS**



Transportation Impact Study

SAN LEANDRO SHORELINE DEVELOPMENT PROJECT

San Leandro, California

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TRANSPORTATION ENGINEERING/PLANNING

Transportation Impact Analysis

San Leandro Shoreline Development Project

San Leandro, California

November 2014

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Project No. 13244

November 2014



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EXECUTIVE SUMMARY

This report summarizes the transportation impact analysis for the proposed San Leandro Shoreline development under baseline, near-term cumulative (2020) and long-term cumulative (2035) conditions.

Project Description

The proposed Project is comprised of a mix of residential and commercial land uses including 150,000 square feet of office space, a 200-room hotel, a 15,000-square-foot conference center, 354 residential units, two new restaurants, a café/boat rental store, and an array of public amenities. A new parking structure and several surface parking lots would be constructed to serve these uses and a new library/community building would replace the current Mulford Branch Library. The Project would generate about 9,408 trips on an average day of which 8,752 are new external vehicular trips. Of the external trips, 1,040 trips would occur during the weekday morning peak hour, 1,060 trips during the weekday evening peak hour, and 1,026 trips during the Saturday midday hour.

Circulation System Performance

The Project's impact on the study freeway segments are considered to be less than significant under all three analysis conditions. However, implementation of the proposed Project would result in significant impacts at the study intersections.

Under the Baseline Conditions, the Project would cause significant impacts at the following intersections:

- Aurora Road and Marina Boulevard (#10)
- Doolittle Drive and Marina Boulevard (#11)
- San Leandro Boulevard and Marina Boulevard (#18)
- Monarch Bay Drive and Mulford Point Drive (#19)

Upon implementation of identified mitigation measures, all four locations would have **less than significant** impacts.

Under the Near-Term Cumulative Conditions, the Project would cause significant impacts at the following intersections:

- Aurora Road and Marina Boulevard (#10)
- Doolittle Drive and Marina Boulevard (#11)
- I-880 southbound ramps and Marina Boulevard (#14)
- San Leandro Boulevard and Marina Boulevard (#18)

- Monarch Bay Drive and Mulford Point Drive (#19)
- Aladdin Avenue and Alvarado Street (#28)

Impacts at all but two of the intersections would be reduced to less than significant levels upon implementation of identified mitigation measures. No feasible measure has been identified to mitigate the project impact at the San Leandro Boulevard and Marina Boulevard (#18) intersection. While feasible measures have been identified for the I-880 southbound ramps and Marina Boulevard (#14) intersection, the intersection is under Caltrans jurisdiction and would require coordination with Caltrans to be implemented. Therefore, the project impacts at these two intersections would remain **significant and unavoidable**.

Under the Long-Term Cumulative Conditions, the Project would cause significant impacts at the following intersections:

- Aurora Road and Marina Boulevard (#10)
- Doolittle Drive and Marina Boulevard (#11)
- Merced Street and Marina Boulevard (#12)
- I-880 southbound ramps and Marina Boulevard (#14)
- San Leandro Boulevard and Marina Boulevard (#18)
- Monarch Bay Drive and Mulford Point Drive (#19)
- Aladdin Avenue and Teagarden Street (#27)

Impacts at all but one intersection would be reduced to less than significant levels upon implementation of identified mitigation measures. Feasible measures have been identified for the I-880 southbound ramps and Marina Boulevard (#14) intersection; however, because the intersection is under Caltrans jurisdiction, they would require coordination with Caltrans to be implemented. Therefore, the project impacts at this intersection would remain **significant and unavoidable**.

Congestion Management Program

The Project would cause significant impacts at the following MTS roadway segments:

- I-880 northbound segment north of Davis Street in Year 2020
- Doolittle Drive northbound segment north of Davis Street in Year 2020 and Year 2035

No feasible mitigation measure has been identified to fully mitigate the project impacts; therefore, the project impacts remain **significant and unavoidable**.

Design and Incompatible Use Hazards

The Project would result in significant design impacts at the northern and southern driveways of the North Golf Course Residential. Upon closure of the northern driveway and relocation of the southern driveway, the project impacts would be less than significant.

Bicycle Impacts

The Project includes installation of Class II bicycle lanes along Monarch Bay Drive and would not result in significant bicycle impacts.

Pedestrian Impacts

The Project includes installation of sidewalks and/or pedestrian pathways and crosswalks at designated locations along Monarch Bay Drive. It would not result in significant pedestrian impacts.

Other Impacts

The Project would not result in any significant impacts related to transit and emergency access.

Parking Discussion

The Project includes a total of 2,057 parking spaces, which are 83 spaces short of the City's Zoning Code requirement. However, the number of proposed spaces exceeds projected parking demand by 412 spaces. Because of internal trip making and shared parking opportunities that would reduce the actual parking demand and the large difference between the parking requirement and the Projected parking demand, the City may consider allowing the Project to provide fewer parking spaces than dictated by the City's Zoning Code. However, the City may require the Project to re-evaluate the placements of the parking in order to better serve the needs of residents, workers and visitors.

INTRODUCTION

This report presents the findings of the transportation impact analysis conducted for the proposed Shoreline Development Project (Project) located in San Leandro, California. The 52-acre project site is located within the San Leandro Shoreline Recreational Area. It includes the Marina Golf Course and the area generally west of Monarch Bay Drive between Marina Boulevard and Fairway Drive. The project site is shown in the vicinity map on Figure 1.

The purpose of the study is to assess potentially impacts resulting from the implementation of the proposed project on the surrounding transportation system and to identify measures to mitigate any significant impacts. The study also serves as the basis for an environmental document that will be prepared for the Project.

PROJECT DESCRIPTION

The Project is a master planned development on the eastern shore of the San Francisco Bay in San Leandro. The main access to the project site is provided by Marina Boulevard and Fairway Drive which are connected by Monarch Bay Drive through the site. Land uses immediately surrounding the project site are primarily residential. Beyond the immediate area toward Interstate 880, a mix of residential, commercial and industrial uses can be found.

The Project is comprised of a mix of residential and commercial land uses including 150,000 square feet of office space, a 200-room hotel, a 15,000-square-foot conference center, 354 residential units, two new restaurants, a café/boat rental store, and an array of public amenities such as picnic areas, bocce ball courts, an aquatic center and dock, and boat launch area. A new parking structure and several surface parking lots would be constructed and a new 8,000-square foot library/community building would replace the current Mulford Branch Library. The project site contains three commercial uses currently in operations. The development of the proposed Project would require the closure of El Torito Restaurant; while Marina Inn and Horatio's Restaurant would remain.

The Project provides a number of pedestrian piers along with a 20-foot wide public promenade along the waterfront edge of the marina. A pedestrian/bicycle bridge would be constructed to connect the two marina peninsulas allowing continual access and enhancing the designated San Francisco Bay Trail. The proposed concept plan is presented in Figure 2.

ANALYSIS APPROACH

The analysis assessed the Project's potential effects on vehicular traffic, transit operations, bicycle and pedestrian transportation, site design and circulation, and emergency access. Discussions on construction-related effects and parking are also included. The Project would be developed in



Project Location
San Leandro, California

Figure
1

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Figure 2 Conceptual Master Plan



multiple phases; however, for the purpose of this study, the Project was analyzed as one single phase in order to evaluate the potential impacts upon full implementation of the Project. The study does not assume any modifications to the existing and planned roadway network as part of the Project.

Analysis Scenarios

Level of service analysis was performed to assess the performance of the circulation system for the weekday morning (AM) and afternoon (PM) peak hours, and, at selected locations, Saturday midday for the following seven scenarios. These scenarios are described in more details in their respective sections:

- Existing (2013) Conditions
- Baseline Conditions
- Baseline with Project Build-out
- Near-Term Cumulative (2020) Conditions
- Near-Term Cumulative (2020) with Project Build-out
- Long-Term Cumulative (2035) Conditions
- Long-Term Cumulative (2035) with Project Build-out

Study Locations

A set of intersections and freeway mainline segments were selected for analysis based upon the anticipated volumes and distributional patterns of project traffic. The selections were made in collaboration with the City of San Leandro staff. The intersection and freeway segment locations are listed below.

Study Intersections

1. Doolittle Drive & Davis Street*
2. Phillips Lane & Davis Street
3. Warden Avenue-Timothy Drive & Davis Street
4. I-880 Southbound ramps & Davis Street
5. I-880 Northbound ramps & Davis Street
6. Doolittle Drive & Williams Street
7. Westgate Parkway & Williams Street
8. Merced Street & Williams Street
9. Neptune Drive & Marina Boulevard
10. Aurora Road & Marina Boulevard*
11. Doolittle Drive & Marina Boulevard*
12. Merced Street & Marina Boulevard*

13. Kaiser Access Driveway & Marina Boulevard*
14. I-880 Southbound ramps & Marina Boulevard*
15. I-880 Northbound ramps & Marina Boulevard*
16. Wayne Avenue-Teagarden Street & Marina Boulevard
17. Alvarado Street & Marina Boulevard
18. San Leandro Boulevard & Marina Boulevard
19. Monarch Bay Drive & Mulford Point Drive
20. Monarch Bay Drive & Pescador Point Drive
21. Monarch Bay Drive & Fairway Drive
22. Aurora Drive & Fairway Drive*
23. Doolittle Drive & Fairway Drive*
24. Merced Street & Fairway Drive*
25. Garfield Drive & Fairway Drive
26. Miller Street & Fairway Drive
27. Teagarden Street & Aladdin Avenue
28. Alvarado Street & Aladdin Avenue
29. Merced Street & Wells Fargo Driveway
30. Merced Street & Republic Avenue
31. Merced Street & West Avenue 140th

“*” indicates locations for which Saturday analysis was conducted.

Study Freeway Segments

Interstate 880 Northbound

- A. Mainline Segment between Washington Avenue and Marina Boulevard
- B. Weaving Section between Marina Boulevard and Davis Street
- C. Mainline Segment between Marina Boulevard and Davis Street
- D. Mainline Segment between Davis Street and 98th Avenue

Interstate 880 Southbound

- E. Mainline Segment between 98th Avenue and Davis Street
- F. Weaving Section between Davis Street and Marina Boulevard
- G. Mainline Segment between Davis Street and Marina Boulevard
- H. Mainline Segment between Marina Boulevard and Washington Avenue

EXISTING CONDITIONS

The existing roadway, transit, bicycle and pedestrian components of the transportation system within the study area are described below.

ROADWAY NETWORK

The existing roadway network in the study area is comprised of the freeway system that serves Alameda County and an extensive street system made up of arterial and local roads.

Freeway

Interstate 880 (I-880) is an eight- to ten-lane freeway with a posted speed limit of 65 miles per hour. The north-south freeway connects San Leandro with nearby cities, such as Hayward and Oakland, and regional destinations, such as Fremont and San Jose. It also provides access to the greater freeway network with direct connections to Interstates 80, 580, 980, 238, US Highway 101, State Routes 92, 237 and 17. The project site is served by interchanges at Marina Boulevard and Davis Street. The average daily traffic on I-880 in the vicinity of Marina Boulevard ranges between 201,000 and 206,000 vehicles per day (vpd)¹. Bicyclists and pedestrians are not allowed on this facility.

Arterials

Marina Boulevard is a two- to six-lane, east-west road with a posted speed limit of 30 to 40 miles per hour. It extends from the project area east to Washington Avenue. Between Monarch Bay Drive and Doolittle Drive, where on-street parking is allowed on intermittent sections of the roadway, Marina Boulevard has two travel lanes and is designated as a residential arterial in the City's General Plan. Sidewalks are generally available along Marina Boulevard with the exception of the I-880 interchange between Merced Street and Teagarden Street where walkways are limited to the southern side of the road. However, as part of the I-880 interchange improvement project under construction, sidewalks will be provided on both sides of the Marina Boulevard Overcrossing upon its completion. In the study area, Marina Boulevard is bordered by industrial, commercial and residential land uses. It is also designated as a local truck route. The roadway becomes Monarch Bay Drive west of Neptune Drive.

Fairway Drive is a two- to four-lane, east-west road with a posted speed limit of 30 to 40 miles per hour. It extends east from the project area to Teagarden Street, where it becomes Aladdin Avenue and continues eastward. West of Doolittle Drive, it is designated as a residential collector street and is divided by raised, landscaped medians. On-street parking is allowed on intermittent sections of Fairway Drive between Nicholson Street and Doolittle Drive, although truck parking is prohibited. Sidewalks are generally provided with the exception of the overpass between Miller and Teagarden Streets where it is

¹ 2012 Traffic Volumes, California Department of Transportation (Caltrans)
<http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm>

limited to the south side of the road. In the study area, Fairway Drive is bordered by industrial, residential and public/open space land uses.

Doolittle Drive is a four-lane, north-south roadway with a posted speed limit of 40 miles per hour. It spans from the city of Alameda to just south of the study area. North of Davis Street, Doolittle Drive is designated as State Route 61 (SR 61). According to Caltrans, the 2012 average daily vehicle volumes in the study area were around 22,300. Doolittle Drive is designated as a local truck route and is bordered by industrial, commercial, and residential land uses in the study area. South of Fairway Drive, it is designated as a collector.

Davis Street is a four- to six-lane, east-west road with a posted speed limit of 35 miles per hour. It spans between Doolittle Drive and East 14th Street in downtown San Leandro where it becomes Callan Avenue. Davis Street is designated as State Route 112 (SR 112) between Doolittle Drive and East 14th Street. In the study area, it is bordered by industrial and commercial land uses. According to Caltrans, the 2012 average daily vehicle volumes in the study area were between 29,000 and 54,000, with the higher volumes near the I-880 interchange. There is a raised median and an overpass for crossing the railroad tracks between Doolittle Drive and Philips Lane. Davis Street is designated as a local truck route. Sidewalks are generally provided on both sides of the roadway but they are limited to the south side on the overpass between Doolittle Drive and Phillips Lane and near I-880 interchange. However, as part of the I-880 interchange improvement project under construction, sidewalks will be provided on both sides of Davis Street upon its completion.

Merced Street is a three- to four-lane, north-south road with a posted speed limit of 35 miles per hour. In the study area, it's bordered by industrial and commercial land uses. Between Williams Street and Marina Boulevard, on-street parking is allowed on intermittent sections of the roadway. Sidewalks are generally provided in the study area.

The daily vehicle volumes along selected arterial roadways in the study area are shown in Table 1.

Collectors

Monarch Bay Drive is a two-lane, north-south road that extends between Marina Boulevard and Estudillo Canal. The posted speed limit on this roadway is 30 miles per hour. There are raised medians south of Fairway Drive and a raised, landscaped median on the northern portion of the roadway at Neptune Drive. On-street parking is allowed on intermittent sections of the roadway. Sidewalk is limited to the west side of the roadway along The Marina Inn frontage. In the study area, it is bordered by commercial and public/open space land uses.

Neptune Drive is a two-lane, north-south roadway with a posted speed limit of 25 miles per hour that provides access to mostly residential land uses near the project site. Sidewalks are provided on both sides of the street. On-street parking is allowed, but truck parking is prohibited. Neptune Drive is a designated Class III bike route and is a part of the San Francisco Bay Trail.

Table 1: Twenty-Four Hour Vehicle Counts of Selected Arterial Roadways

| Roadway | Segment | Direction | Weekday | Saturday |
|--------------|-----------------------------------|--------------|---------------|---------------|
| Doolittle Dr | Marina Blvd to Fairway Dr | Northbound | 8,860 | 6,190 |
| | | Southbound | 6,960 | 4,850 |
| | | Total | 15,820 | 11,040 |
| Doolittle Dr | Williams St to Marina Blvd | Northbound | 8,080 | 4,950 |
| | | Southbound | 7,170 | 4,625 |
| | | Total | 15,250 | 9,575 |
| Davis St | Doolittle Dr to Warden-Timothy Dr | Eastbound | 11,555 | 8,270 |
| | | Westbound | 11,470 | 7,885 |
| | | Total | 23,025 | 16,155 |
| Marina Blvd | Neptune Dr to Aurora Dr | Eastbound | 2,635 | 3,460 |
| | | Westbound | 2,355 | 3,190 |
| | | Total | 4,990 | 6,650 |
| Marina Blvd | Doolittle Dr to Merced St | Eastbound | 9,705 | 9,125 |
| | | Westbound | 10,050 | 8,940 |
| | | Total | 19,755 | 18,065 |
| Fairway Dr | Monarch Bay Dr to Aurora Dr | Eastbound | 1,300 | 1,260 |
| | | Westbound | 1,120 | 1,060 |
| | | Total | 2,420 | 2,320 |
| Fairway Dr | Doolittle Dr to Merced St | Eastbound | 4,725 | 3,080 |
| | | Westbound | 4,440 | 2,785 |
| | | Total | 9,165 | 5,865 |

Counts collected on Thursday, January 17, 2013 and Saturday, January 19, 2013.
Kittlelson & Associates, Inc., 2013

Aurora Drive is a two-lane, north-south road with a posted speed limit of 25 miles per hour that provides access to residential land uses. In the study area, on-street parking is allowed but truck parking is prohibited. Sidewalks are provided on both sides of the street.

Williams Street is a two-lane, east-west road with a posted speed limit of 30 to 35 miles per hour. In the study area, Williams Street is bordered by industrial land uses between I-880 and Doolittle Drive. West of Doolittle Drive, it is lined with residential uses on the south side of the street. Williams Street, a designated local truck route, generally maintains sidewalks on both sides of the roadway.

Local Streets

Mulford Point Drive is a two-lane, discontinuous road that provides access to the Marina and its parking lots from Monarch Bay Drive. No sidewalk is provided along the road though pedestrian paths are found along the Marina and portion of the bay.

Pescador Point Drive is a two-lane, discontinuous road. It provides access to the Marina Inn and the Marina. There are raised medians and on-street parking along this road.

TRANSIT FACILITIES

San Leandro has established a well-developed transit system that includes bus and rail services provided by Alameda-Contra Costa Transit District (AC Transit), LINKS service, Bay Area Rapid Transit system (BART), and Amtrak. Such services are described below.

AC Transit

AC Transit provides bus service in Alameda and western Contra Costa Counties serving 13 cities and the unincorporated areas of Alameda County. It operates local and school buses, as well as Transbay routes to San Francisco and the Peninsula. It is also a service provider for paratransit. Additionally, AC Transit is a participating transit provider for the regional, All Nighter bus system, providing night owl bus service when BART is not operating. Buses are equipped with front-loading racks that can hold up to two bicycles.

In the project vicinity, AC Transit operates one local bus route, Route 89, connecting the San Leandro Shoreline Recreational Area with BART via the San Leandro Station and the Bay Fair Station and other local destinations such as downtown San Leandro and Bayfair Shopping Center. The nearest bus stops to the project site, indicated with a pole and sign showing the route number, are located on Monarch Bay Drive at Mulford Point Drive and at Neptune Drive. Other bus routes in the study area include Local Route 75 and Transbay Route S. Bus service on these routes are detailed in Table 2 and illustrated in Figure 4.

Although Rapid Bus service is currently in operation with the 1R line connecting Berkeley BART to San Leandro BART, AC Transit plans to introduce the Bus Rapid Transit (BRT) system in the East Bay. According to the *East Bay Bus Rapid Transit Project Design Workshop* conducted on November 2012, the proposed line would span 9.5 miles connecting Downtown Oakland to Downtown San Leandro. The system would include stops in Downtown San Leandro and the San Leandro BART station. A dedicated bus lane is proposed for a majority of the corridor. Other amenities would also be provided such as sheltered seating at bus stops, off-bus fare payment, real-time arrival signs and traffic signal priority. The BRT project is expected to start construction in 2014 and open for service in 2016.

LINKS

The LINKS program is a free shuttle that provides transportation between San Leandro BART Station to major employment centers in west San Leandro. It is funded by a Business Improvement District fee and various grants including those from the Bay Area Air Quality Management District (BAAQMD). It is managed by the Transportation Management Organization and operated by M.V. Transportation. The shuttle operates every 20 minutes on non-holiday weekdays from 5:45 AM to 9:45 AM, and from 3:00

PM to 8:00 PM.² The nearest bus stops from the project site are located on Doolittle Drive at Marina Boulevard and Fairway Drive.

FLEX Shuttle

The City of San Leandro provides transportation for seniors and people with disabilities through the FLEX Shuttle service. Riders must be residents of San Leandro and must be 60 years of age or older, or at least 18 years of age and East Bay Paratransit certified.³ FLEX Shuttle requires an annual registration fee of \$20 along with an application which must be renewed by June 30 of each year in order to continue using the shuttle; however, after the annual fee is paid, the shuttle can be used at no additional charge. The shuttle operates Monday through Friday between 9:00 a.m. and 5:00 p.m. and operates a north and south route. The northern route operates in the northern portion of San Leandro and the southern route operates in the southern half of the City. Each route has 10 stops at various locations.

Table 2: AC Transit Bus Service in the Study Area

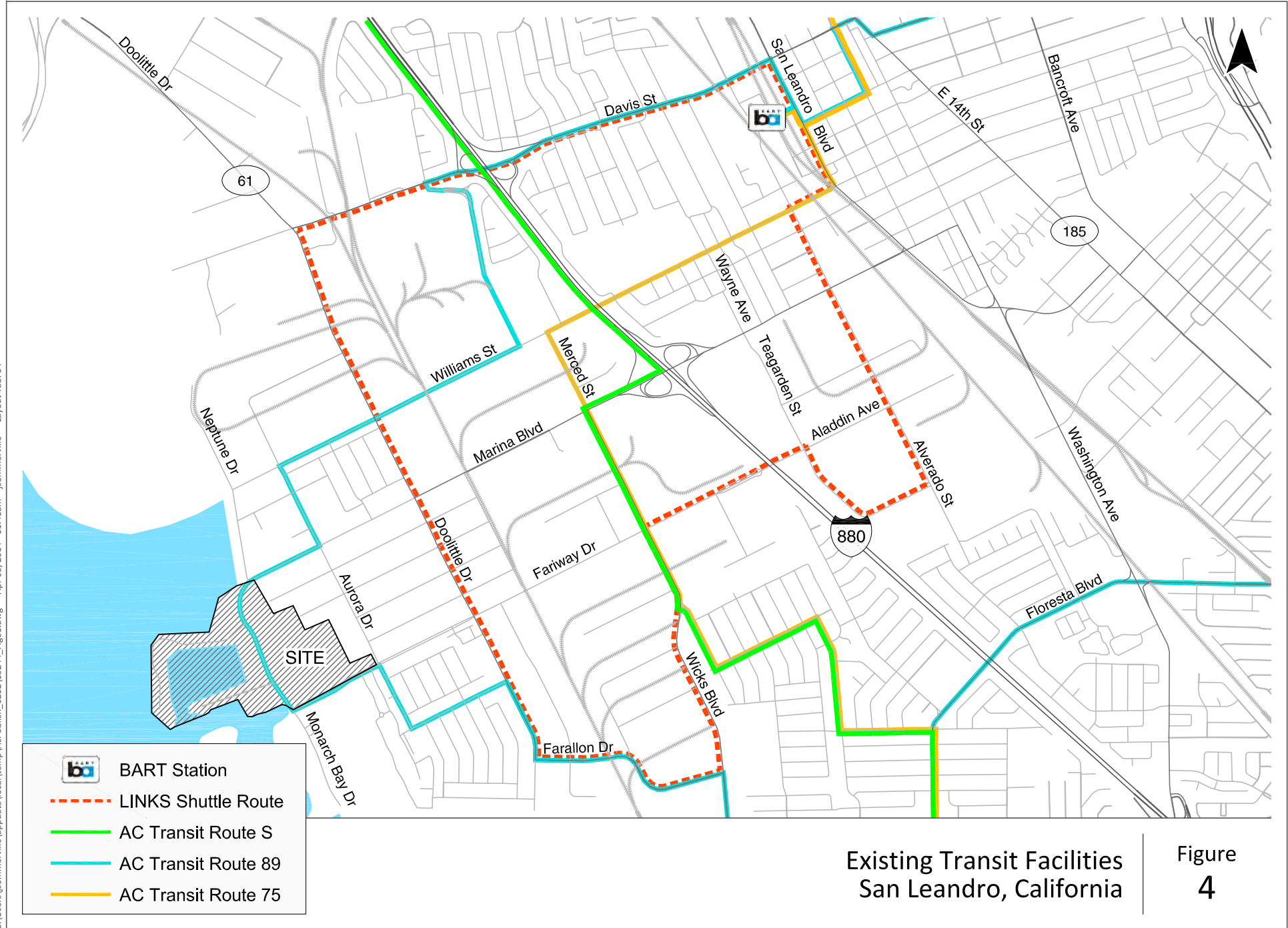
| Route | Serving | Timepoints | Day | Times | |
|-------|---|---|-------------------|------------|-------------------|
| 75 | San Leandro, Ashland, Castro Valley, Oakland | San Leandro BART; Marina Blvd & Merced St; Purdue St & Farnsworth St; Washington Ave & Lewelling Blvd; Bay Fair BART; Estudillo Ave & MacArthur Blvd; Bancroft Ave & Dutton Ave | Weekday | First | 5:31 AM |
| | | | | Last | 8:58 PM |
| | | | | Frequency | 60 minutes |
| | | | Weekend | No service | |
| 89 | San Leandro, Ashland, Castro Valley | San Leandro BART; Davis St & Hays St; Estudillo Ave & Bancroft Ave; Bay Fair BART; Washington Ave & Floresta Blvd; Farallon St & Wicks Blvd; Fairway Dr & Aurora Dr; Marina Blvd & Aurora Dr | Weekday | First | 5:15 AM |
| | | | | Last | 8:52 PM |
| | | | | Frequency | 30 minutes |
| | | | Weekend | First | 7:00 AM |
| | | | | Last | 8:01 PM |
| | | | | Frequency | 60 minutes |
| S | San Francisco, Oakland, San Leandro, San Lorenzo, Hayward | San Francisco (Transbay Temporary Terminal); Marina Blvd & Merced St; Manor Blvd & Farnsworth St; Washington Ave & Lewelling Blvd; Paseo Grande & Hesperian Blvd; Winton Ave & Hesperian Blvd; Hesperian Blvd & Tahoe Ave; Eden Shores Park | Weekday Eastbound | First | 4:15 PM |
| | | | | Last | 8:15 PM |
| | | | | Frequency | 30 minutes |
| | | | Weekday Westbound | First | 5:10 AM |
| | | | | Last | 8:50 AM |
| | | | | Frequency | 15 minutes (peak) |
| | | | Weekend | No service | |

Source: AC Transit website, www.actransit.org, accessed July 29, 2013

Kittelson & Associates, Inc., 2013

² San Leandro LINKS website, <http://www.sanleandrolinks.com/>, accessed December 31, 2013

³ City of San Leandro, FLEX Shuttle Service, <https://www.sanleandro.org/depts/rec/paratransit.asp#flexsvc>, accessed on November 12, 2014.



Existing Transit Facilities
San Leandro, California

Figure
4

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BART

Bay Area Rapid Transit (BART) provides heavy-rail, regional transit service to Alameda, San Francisco, Contra Costa, and San Mateo counties from the San Leandro BART Station, located at Davis and San Leandro Streets about 2.9 miles from the project site. BART’s direct service from this station includes the Richmond-Fremont line, the Dublin-Pleasanton/Daly City-Millbrae line, and the Fremont/Daly City line. Table 3 summarizes BART service from the San Leandro station.

Table 3: BART Service from San Leandro Station

| Line | Day | Times | |
|--|----------|-------------------|---------------|
| Fremont/Richmond | Weekday | First | 4:20 AM |
| | | Last | 1:10 AM |
| | | Frequency | 15-20 minutes |
| | Saturday | First | 6:15 AM |
| | | Last | 1:10 AM |
| | | Frequency | 20 minutes |
| | Sunday | First | 8:15 AM |
| | | Last | 1:10 AM |
| | | Frequency | 20 minutes |
| Dublin-Pleasanton/Daly City - Millbrae | Weekday | First | 4:35 AM |
| | | Last | 12:40 AM |
| | | Frequency | 15-20 minutes |
| | Saturday | First | 6:20 AM |
| | | Last | 12:40 AM |
| | | Frequency | 20 minutes |
| | Sunday | First | 8:20 AM |
| | | Last | 12:40 AM |
| | | Frequency | 20 minutes |
| Fremont/Daly City | Weekday | First | 5:30 AM |
| | | Last | 7:40 PM |
| | | Frequency | 15 minutes |
| | Saturday | First | 9:10 AM |
| | | Last | 7:40 PM |
| | | Frequency | 20 minutes |
| | Sunday | No direct service | |

Source: BART Fares and Schedules, accessed December 31, 2013.

Kittelson & Associates, Inc., 2013

Amtrak

Amtrak operates interstate and intercity heavy rail service. It's Capital Corridor and Coast Starlight routes run through San Leandro just west of San Leandro Boulevard, but there are currently no Amtrak stops in the city. The Capital Corridor route is served by the Oakland Coliseum Station, which is also adjacent to a BART station, located about five miles north from the project site; while the Coast Starlight route is served by the Oakland Jack London Square Station about ten miles away. The City's General Plan calls for further exploration of an Amtrak station stop, possibly near the San Leandro BART station.

BICYCLE AND PEDESTRIAN FACILITIES

Bicycling and pedestrian facilities are important components of the transportation network in the study area. They not only offer non-vehicular opportunities for both commute and recreational trips but also provide connections to BART and bus stations to allow access the regional's transit network.

Existing Bicycle Facilities

Bicycle routes and paths are typical examples of bicycle transportation facilities in the project area. Bicycle facilities are defined by the following three classes in Chapter 1000 of California Department of Transportation's (Caltrans) Highway Design Manual:

- **Class I** – Provides a completely separated facility designed for the exclusive use of bicyclists and pedestrians with crossing points minimized.
- **Class II** – Provides a restricted right-of-way designated lane for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with vehicle parking and cross-flows by pedestrians and motorists permitted.
- **Class III** – Provides a right-of-way designated by signs or permanent markings and shared with pedestrians and motorists.

According to the San Leandro Bicycle and Pedestrian Master Plan⁴ and field observations, the following bikeways are currently present within the study area:

- **Class I Bike Paths**
 - Oyster Bay Regional Shoreline
 - Intermittent sections of Pescador Point Drive and Mulford Point Drive. These paths are part of the San Francisco Bay Trail. When complete, the Bay Trail will allow continuous pedestrian and bicycle travel around the shoreline of San Francisco Bay.

⁴ City of San Leandro, *San Leandro Bicycle and Pedestrian Master Plan*. Adopted September 2010.

- **Class II Bike Lanes**
 - Davis Street between Gilmore Drive and the railroad tracks west of Alvarado Street
 - Williams Street between Neptune Drive and San Leandro Boulevard
 - Fairway Drive between Monarch Bay Drive and Miller Street
 - Aladdin Avenue between Teagarden Street and Alvarado Street
 - Teagarden Street between Aladdin Avenue and Alvarado Street
 - Doolittle Drive between City Limit and William Street and between Fairway Drive and Farallon Drive
 - Westgate Parkway between Walmart driveway and Williams Street
 - Alvarado Street between West Estudillo Avenue and Thornton Street
 - Alvarado Street between Marina Boulevard and Aladdin Avenue
 - San Leandro Boulevard between Davis Street and Washington Boulevard
 - Merced Street between Marina Boulevard and Fairway Drive

- **Class III Bike Routes**
 - Neptune Drive between Oyster Bay Regional Shoreline entrance and Marina Boulevard. This is part of the San Francisco Bay Trail.
 - Fairway Drive-Aladdin Avenue between Miller Street and Teagarden Street
 - Alvarado Street between Teagarden Street and Fremont Avenue

Proposed Bicycle Facilities

The San Leandro Bicycle and Pedestrian Master Plan proposed a number of improvements to better connect the existing bicycle network in the city. In the study area, it includes the following proposed bikeways:

- **Class I Bike Paths**
 - San Leandro Shoreline Development
 - Along railroad tracks that would extend along BART right-of-way across the city

- **Class II Bike Lanes**
 - Monarch Bay Drive between Neptune Drive and Fairway Drive
 - Merced Street between Williams Street and West 140th Avenue (Note: The section between Marina Boulevard and Fairway Drive was completed in early 2014.)
 - Wicks Boulevard between Merced Street and Burroughs Avenue
 - Doolittle Drive between Williams Street and Fairway Drive
 - Davis Street between Doolittle Drive and Phillips Lane
 - Davis Street on the I-880 overpass (Note: This section is scheduled to be completed by mid-2015.)
 - Davis Street between San Leandro Boulevard and East 14th Street
 - Alvarado Street between Aladdin Avenue and Teagarden Street

- **Class III Bike Routes**

- Davis Street west of Doolittle Drive
- Alvarado Street between Thornton Street and Marina Boulevard
- Timothy Drive-Westgate Parkway between Davis Street and Walmart driveway

Bicyclist Volumes

Bicyclists were counted at a number of study intersections between January and May of 2013. The highest volumes were found at Monarch Bay Drive & Pescador Point Drive intersection within the project site where 26 bicyclists were observed during the midday hour on Saturday. Table 4 shows the peak hour volumes during weekday AM and PM and Saturday midday at six representative study intersections.

Table 4: Bicyclist Intersection Volumes

| # | Intersection | Peak | Times | Volumes |
|----|--|------|---------------------|---------|
| 5 | Aurora Drive & Fairway Drive | AM | 7:15 AM - 8:15 AM | 2 |
| | | PM | 5:00 PM - 6:00 PM | 13 |
| | | Sat | 11:30 AM - 12:30 PM | 4 |
| 10 | Merced Street & Marina Boulevard | AM | 7:30 AM - 8:30 AM | - |
| | | PM | 4:30 PM - 5:30 PM | - |
| | | Sat | 12:45 PM - 1:45 PM | 8 |
| 14 | Doolittle Drive & Fairway Drive | AM | 7:30 AM - 8:30 AM | - |
| | | PM | 4:45 PM - 5:45 PM | - |
| | | Sat | 12:45 PM - 1:45 PM | 4 |
| 26 | Aurora Drive & Marina Boulevard | AM | 7:30 AM - 8:30 AM | - |
| | | PM | 5:00 PM - 6:00 PM | - |
| | | Sat | 11:45 PM - 12:45 PM | 11 |
| 28 | Monarch Bay Drive & Mulford Point Drive | AM | 8:00 AM - 9:00 AM | 1 |
| | | PM | 5:00 PM - 6:00 PM | 7 |
| | | Sat | 12:00 PM - 1:00 PM | 19 |
| 29 | Monarch Bay Drive & Pescador Point Drive | AM | 8:00 AM - 9:00 AM | 1 |
| | | PM | 4:45 PM - 5:45 PM | 9 |
| | | Sat | 12:00 PM - 1:00 PM | 26 |

Counts conducted by Marks Traffic Data on Thursday, January 17, 2013 for the AM (7:00 to 9:00 am) and PM (4:00 to 6:00 pm) peak-hours and Saturday, February 2, 2013 from 10:00 am to 2:00 pm for Intersection #10, #14 and #26. Counts were conducted separately for Intersections #5, #28 and #29 on Thursday, May 30, 2013 for the AM and PM peak-hours and Saturday, May 18, 2013.

Kittelson & Associates, Inc., 2013

Existing Pedestrian Facilities

Pedestrian facilities are limited around the project site on Monarch Bay Drive from Fairway Drive to Neptune Drive. Four-foot wide sidewalks are only provided at intermittent sections on the west side of the roadway; while no sidewalks are provided on the eastern side along Monarch Bay Drive by the Marina Golf Course. Connecting roadways to the project site such as Neptune Drive, Marina Boulevard and Fairway Drive are generally provided with concrete sidewalks in good condition on both sides of the street.

Marked crosswalks are not provided along Monarch Bay Drive; however, pedestrian ramps are present at almost all intersection corners in the study area, but lack truncated domes for visually impaired pedestrians.



Sidewalk along Monarch Bay Drive



Unmarked crosswalk on Monarch Bay Drive

Pedestrian Volumes

Pedestrians were counted at six intersections in the study area in February and May 2013. The highest pedestrian volumes were observed at the Aurora Drive & Fairway Drive intersection during all three observation periods. The lowest pedestrian volumes were along Monarch Bay Drive at Mulford Point Drive and Pescador Point Drive. Only one pedestrian was observed on either intersection during the Saturday peak-hour. Table 5 shows the observed volumes at six study intersections.

RAILROAD CROSSINGS

Some of the roadways in the study area are bisected by at-grade railroad crossings, which are owned and operated by Union Pacific Railroad (UPRR). As observed during a field survey, all of the at-grade crossings in the study area appeared to be provided with adequate features to facilitate traffic crossings for vehicles, pedestrians and bicyclists, including concrete pavement beds, warning bells and crossing gates.

Table 5: Pedestrian Intersection Volumes

| # | Intersection | Peak | Times | Volumes |
|----|--|------|---------------------|---------|
| 5 | Aurora Drive & Fairway Drive | AM | 7:15 AM - 8:15 AM | 21 |
| | | PM | 5:00 PM - 6:00 PM | 14 |
| | | Sat | 11:30 AM - 12:30 PM | 24 |
| 10 | Merced Street & Marina Boulevard | AM | 7:30 AM - 8:30 AM | NA |
| | | PM | 4:30 PM - 5:30 PM | NA |
| | | Sat | 12:45 PM - 1:45 PM | 8 |
| 14 | Doolittle Drive & Fairway Drive | AM | 7:30 AM - 8:30 AM | NA |
| | | PM | 4:45 PM - 5:45 PM | NA |
| | | Sat | 12:45 PM - 1:45 PM | 14 |
| 26 | Aurora Drive & Marina Boulevard | AM | 7:30 AM - 8:30 AM | NA |
| | | PM | 5:00 PM - 6:00 PM | NA |
| | | Sat | 11:45 PM - 12:45 PM | 14 |
| 28 | Monarch Bay Drive & Mulford Point Drive | AM | 8:00 AM - 9:00 AM | 4 |
| | | PM | 5:00 PM - 6:00 PM | 1 |
| | | Sat | 12:00 PM - 1:00 PM | 1 |
| 29 | Monarch Bay Drive & Pescador Point Drive | AM | 8:00 AM - 9:00 AM | 8 |
| | | PM | 4:45 PM - 5:45 PM | 6 |
| | | Sat | 12:00 PM - 1:00 PM | 1 |

Counts for Intersection #10, #14 and #26 conducted on Saturday, February 2, 2013 from 10:00 am to 2:00 pm. No AM and PM peak period counts were conducted at these three locations. Counts for Intersections #5, #28 and #29 were conducted on Thursday, May 30, 2013 for the AM and PM peak-hours and Saturday, May 18, 2013.

Kittelson & Associates, Inc., 2013

TRUCK ROUTES

The City of San Leandro has established a two-tier truck route system on city-operated roadways in its General Plan. The first tier is for through trips where the origin and destination of the trucks are not within the city limits. The second tier is for local access trips where the origin or destination is in San Leandro. For sites in San Leandro that are not on the local truck routes, trucks must access the designated truck routes as directly as possible to their origin or from their destination.

San Leandro Boulevard is a designated truck route for through trips in the study area; while the following roadways are designated as local truck routes:

- Davis Street, Marina Boulevard and Fairway Drive east of Doolittle Drive
- Williams Street west of I-880
- Alvarado Street south of Marina Boulevard
- Doolittle Drive
- Merced Street

Truck Volumes

Truck volumes by vehicle class were collected on a typical weekday in January 2013 on four designated truck route segments in the study area. The volumes and relative percentages are summarized in Table 6. The highest number of truck traffic was observed on Davis Street with just over 3,000 trucks, which represents about 13 percent of total traffic. Comparatively, trucks on Marina Boulevard and Fairway Drive only represent about 7 to 8 percent of total traffic.

Table 6: Weekday Truck Counts and Percentages

| Roadway | Segment | Direction | Total Vehicles | Class 5-7 | | Class 8-13 | | Total Trucks | |
|------------------|------------------------------------|--------------|----------------|-----------|---------|------------|---------|--------------|---------|
| | | | | Volume | Percent | Volume | Percent | Volume | Percent |
| Fairway Drive | Doolittle Drive to Merced Street | Eastbound | 4,724 | 245 | 5.19% | 91 | 1.93% | 336 | 7.11% |
| | | Westbound | 4,443 | 216 | 4.86% | 83 | 1.87% | 299 | 6.73% |
| | | Total | 9,167 | 461 | 5.03% | 174 | 1.90% | 635 | 6.93% |
| Marina Boulevard | Doolittle Drive to Merced Street | Eastbound | 9,703 | 522 | 5.38% | 223 | 2.30% | 745 | 7.68% |
| | | Westbound | 10,051 | 458 | 4.56% | 323 | 3.21% | 781 | 7.77% |
| | | Total | 19,754 | 980 | 4.96% | 546 | 2.76% | 1526 | 7.73% |
| Davis Street | Doolittle Drive and Warden Avenue- | Eastbound | 11,556 | 1,375 | 11.90% | 495 | 4.28% | 1,870 | 16.18% |
| | | Westbound | 11,470 | 836 | 7.29% | 302 | 2.63% | 1,138 | 9.92% |
| | | Total | 23,026 | 2,211 | 9.60% | 797 | 3.46% | 3,008 | 13.06% |
| Doolittle Drive | Marina Boulevard and Fairway | Northbound | 8,860 | 471 | 5.32% | 232 | 2.62% | 703 | 7.93% |
| | | Southbound | 6,961 | 305 | 4.38% | 105 | 1.51% | 410 | 5.89% |
| | | Total | 15,821 | 776 | 4.90% | 337 | 2.13% | 1113 | 7.03% |

Counts conducted on Thursday, January 17, 2013.

Class 5-7 vehicles are non-articulated trucks, such as delivery, gravel and dump trucks. Class 8-13 vehicles are articulated trucks where the motor-powered units are detachable from the cargo-carrying units.

Kittelsohn & Associates, Inc. 2014

EXISTING TRAFFIC CONDITIONS

The existing operations of the study intersections and freeway mainline segments and ramp merge and diverge areas were assessed. The analysis was based on count data collected. Intersection turning movement volumes were collected at the study intersections during typical weekday morning (AM)

peak period (7:00 am to 9:00 am) and afternoon (PM) peak period (4:00 pm to 6:00 pm) and during Saturday midday period (10:00 am to 2:00 pm) in January 2013. The existing intersection volumes and lane geometries are shown in Figure 5 and Figure 6. Freeway volumes were compiled from Caltrans' California Freeway Performance Measurement System (PeMS) in January 2014. The volumes are shown in Table 9.

Analysis Methodologies and Level of Service Standards

"Levels of service" describe the operating conditions experienced by motorists. Level of service is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, driving comfort and convenience. Levels of service are designated "A" through "F" from best to worst, which cover the entire range of traffic operations that might occur. Level of Service (LOS) "A" through "E" generally represents traffic volumes at less than roadway capacity, while LOS "F" represents over capacity and/or forced flow conditions.

Intersection

Intersection analyses were conducted using the operational methodology outlined in the 2000 Highway Capacity Manual (HCM) (Transportation Research Board, Washington, D.C., 2000) and Synchro software tool as required by the City of San Leandro.

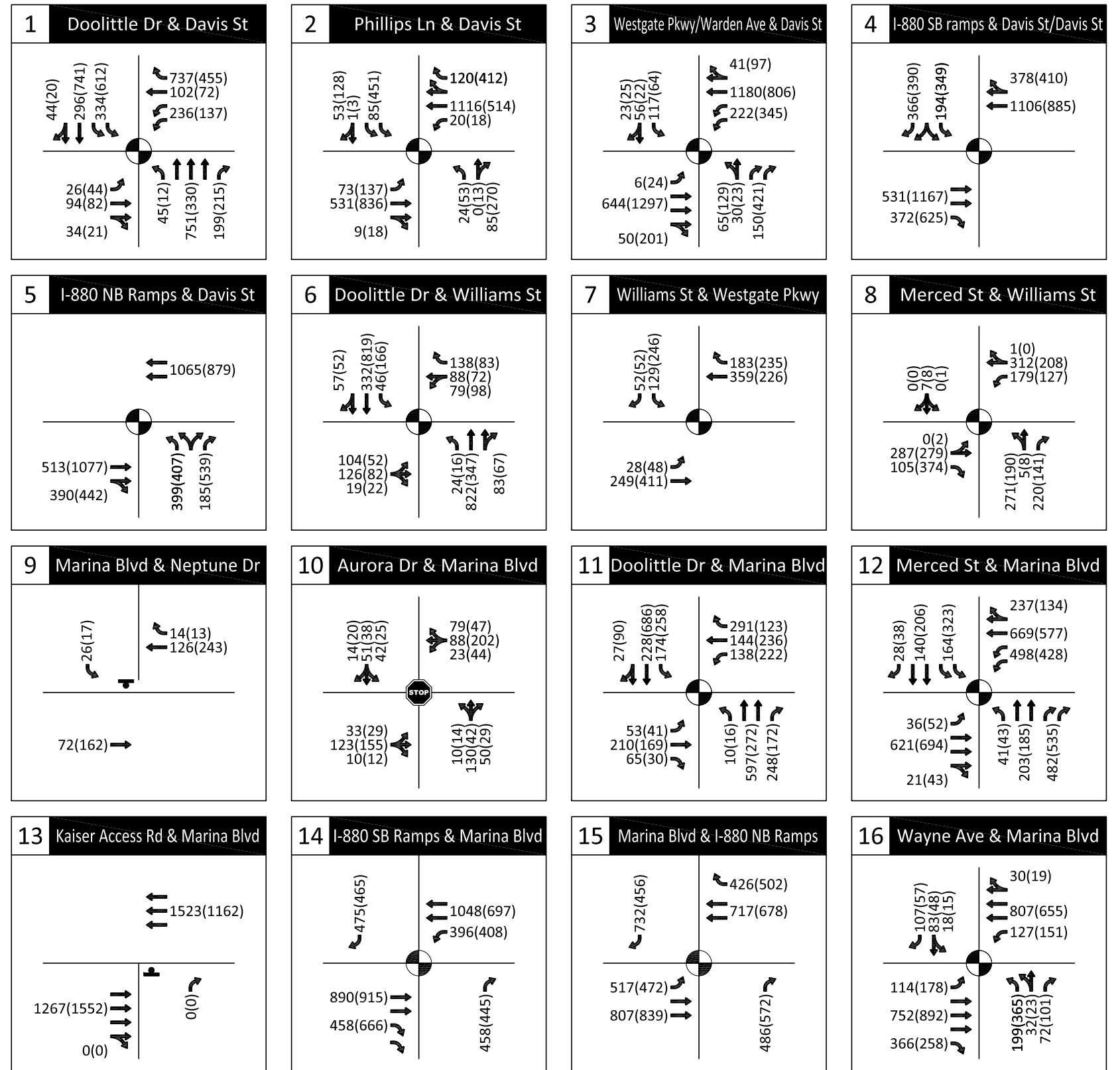
Signalized intersection. The HCM procedure calculates a weighted average stop delay in seconds per vehicle at a signalized intersection, and assigns a level of service designation based upon the delay.

Unsignalized intersection. The HCM methodology calculates a weighted average stop delay in seconds per vehicle for each controlled intersection leg and for the intersection as a whole. A level of service designation is assigned based upon the weighted average control delay per vehicle on the intersection leg with the worst delay at one- or two-way stop-controlled intersections. For all-way stop-controlled intersections, a level of service designation is based upon the weighted average control delay for all intersection legs, similar to the level of service designation for signalized intersections.

Table 7 presents the relationship of average delay to level of service for both signalized and stop-controlled intersections.

Freeway Mainline Segments

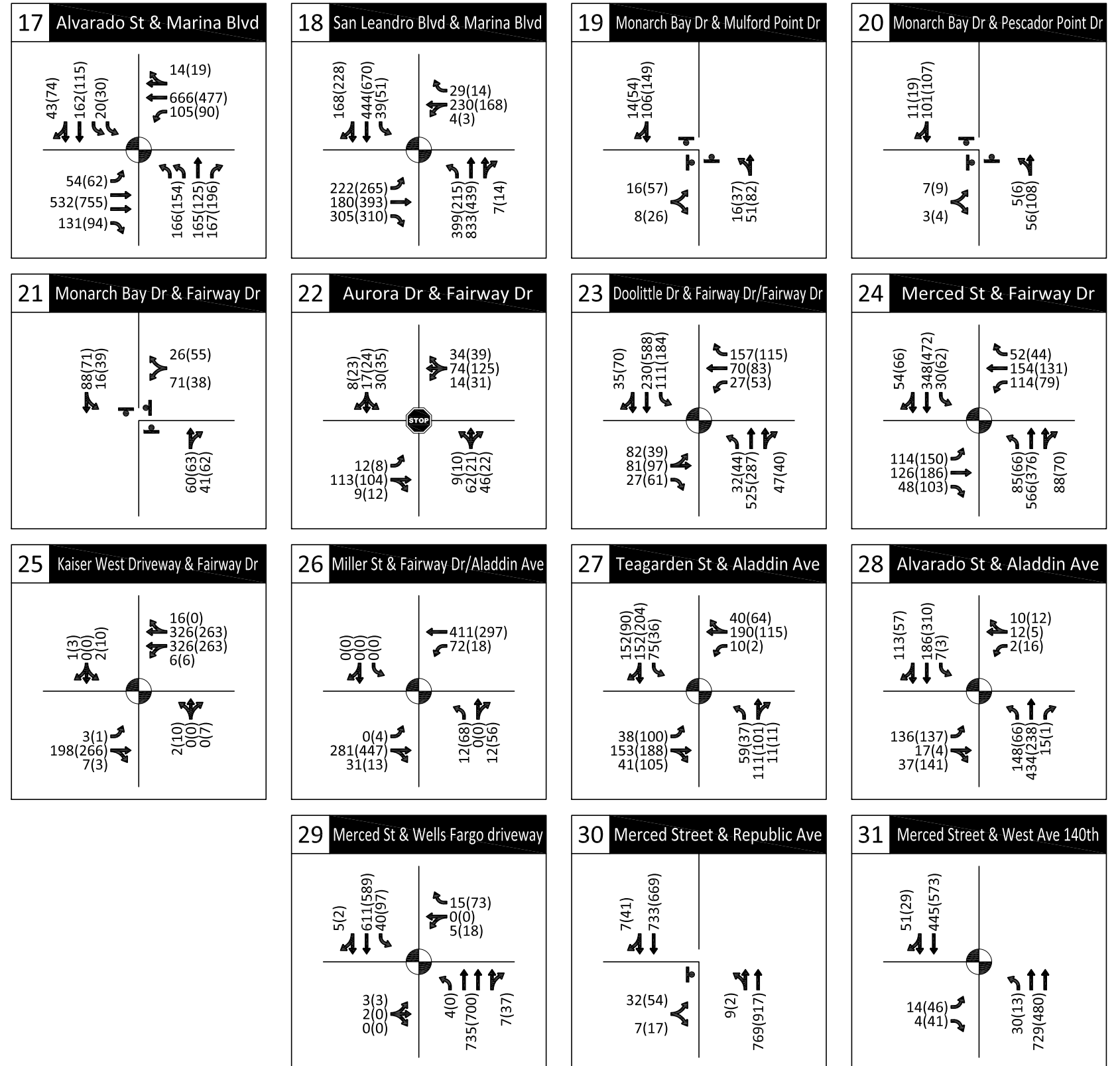
For both circulation system performance and congestion management program (CMP) analyses, the methodology outlined in the Highway Capacity Manual (HCM) (Transportation Research Board, Washington, D.C., 2010) and Highway Capacity Software (HCS) tool were used to calculate the density in terms of passenger cars per mile per lane for the study freeway segments and to determine the LOS threshold from A to F. Table 8 shows the relationship of freeway density to level of service.



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

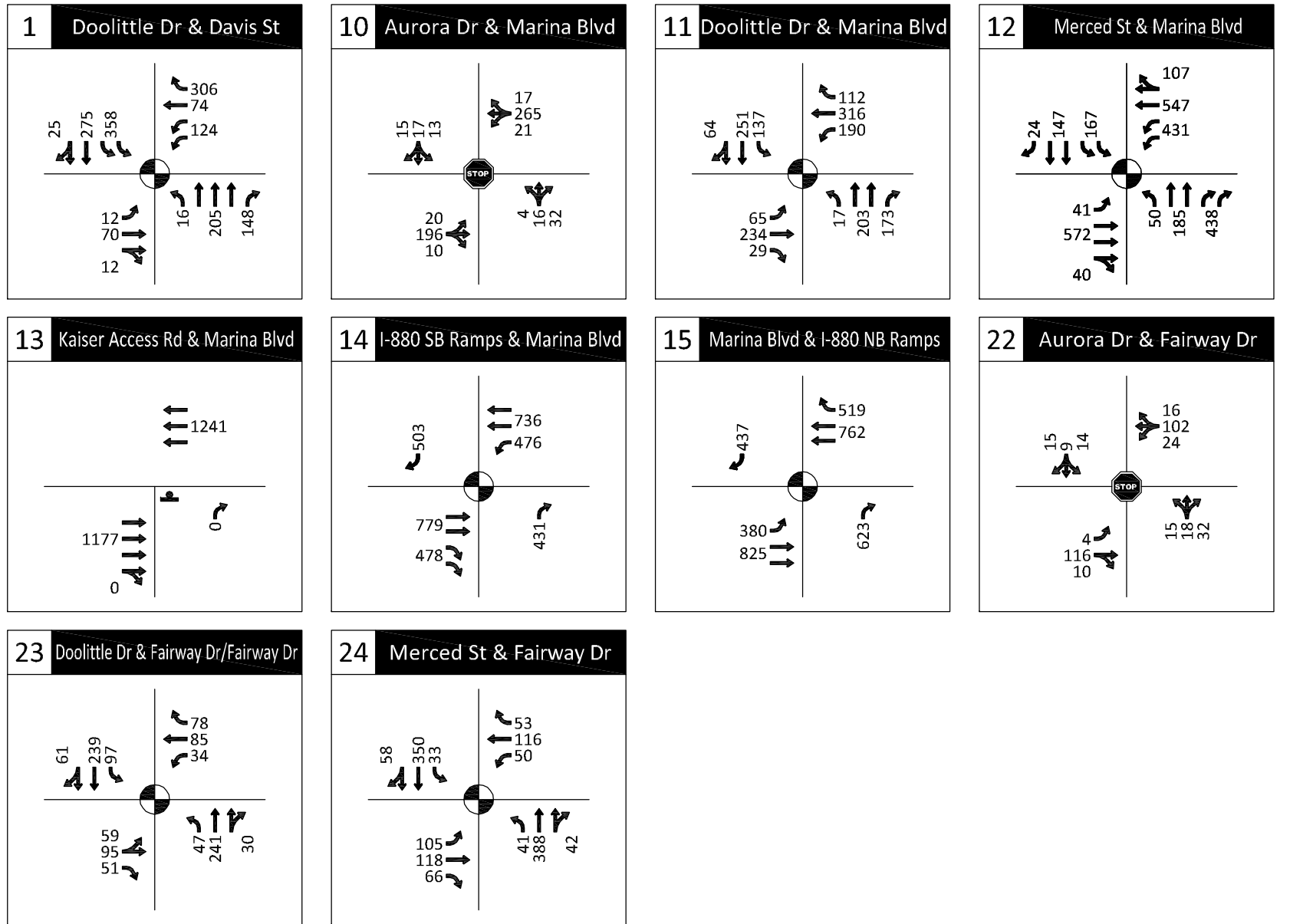
Figure 5



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

Figure 5



AM(PM) - Traffic Volume
 - Traffic Signal
 - All-Way Stop
 - Stop Sign

Saturday Peak Hour Intersection Traffic Volumes and Lane Configurations
 Existing San Leandro, California

Figure 6

Table 7: Level of Service Definition for Intersections

| Signalized Intersection | | | Unsignalized Intersection |
|-------------------------------------|-----|---|-------------------------------------|
| Average Delay Per Vehicle (Seconds) | LOS | Description of Traffic Conditions | Average Delay Per Vehicle (Seconds) |
| ≤10.0 | A | Free flowing. Most vehicles do not have to stop. | ≤10.0 |
| >10.0 and ≤20.0 | B | Minimal delays. Some vehicles have to stop, although waits are not bothersome. | >10.0 and ≤15.0 |
| >20.0 and ≤35.0 | C | Acceptable delays. Significant numbers of vehicles have to stop because of steady, high traffic volumes. Still, many pass without stopping. | >15.0 and ≤25.0 |
| >35.0 and ≤55.0 | D | Tolerable delays. Many vehicles have to stop. Drivers are aware of heavier traffic. Cars may have to wait through more than one red light. Queues begin to form, often on more than one approach. | >25.0 and ≤35.0 |
| >55.0 and ≤80.0 | E | Significant delays. Cars may have to wait through more than one red light. Long queues form, sometimes on several approaches. | >35.0 and ≤50.0 |
| >80.0 | F | Excessive delays. Intersection is jammed. Many cars have to wait through more than one red light, or more than 60 seconds. Traffic may back up into “up-stream” intersections. | >50.0 |

Source: Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., 2000.

Table 8: Level of Service Definition for Freeway Mainline Segment

| Level of Service | Density (passenger vehicles per mile per lane) |
|------------------|---|
| A | ≤11 |
| B | >11-18 |
| C | >18-26 |
| D | >26-35 |
| E | >35-45 |
| F | >45 Demand exceeds capacity |

Source: Transportation Research Board, *Highway Capacity Manual* Washington, D.C., 2010, 11-7.

Freeway Weaving Analysis

For the circulation system performance analysis, freeway weaving segments were analyzed using the Leisch Method as described in the Caltrans Design Manual, dated May 7, 2012. Freeway weaving conditions are dependent upon traffic volumes and the weaving length between the interchanges; lane configurations, and free-flow speed of the freeway segment. Weaving analysis is typically applicable for freeway segments where the distance between an on-ramp and a downstream off-ramp is less than 2,500 feet.

CMP Arterial Segment Analysis

Level of service analysis for designated Metropolitan Transportation System (MTS) arterial segments was performed based on the service volume table shown in Exhibit 10-7 of the HCM 2000. A volume to capacity ratio was calculated using the volumes from the Alameda Countywide Travel Demand Model and using the LOS F service volume threshold shown in Exhibit 10-7 as the estimate for roadway capacity.

Existing Freeway Levels of Service

Table 9 presents the level of service on the study freeway segments under existing conditions. All study segments are experiencing LOS D or better condition with the exception of the I-880 northbound segment between Marina Boulevard and Davis Street. This mainline segment experiences LOS E during the AM peak hour.

Table 9: Freeway Level of Service – Existing Conditions

| Location | Type | Existing – AM Peak Hour | | | Existing – PM Peak Hour | | |
|--------------------------------|--------------------|-------------------------|----------------------|------------------|-------------------------|----------------------|------------------|
| | | Volume ¹ | Density ² | LOS ³ | Volume ¹ | Density ² | LOS ³ |
| I-880 Northbound | | | | | | | |
| Washington Ave to Marina Bl | Mainline | 7,957 | 28.0 | D | 7,161 | 24.7 | C |
| Marina Blvd. to Davis St. | Mainline | 8,356 | 36.2 | E | 7,426 | 32.7 | D |
| | Weave ⁴ | 1,563 | N/A | B | 1,953 | N/A | C |
| Davis St. to 98th Av. | Mainline | 6,151 | 26.9 | D | 5,695 | 24.5 | C |
| I-880 Southbound | | | | | | | |
| 98th Av. to Davis St | Mainline | 5,619 | 24.2 | C | 6,340 | 27.9 | D |
| Davis St. to Marina Blvd. | Mainline | 6,584 | 26.0 | C | 7,712 | 32.3 | D |
| | Weave ⁴ | 1,164 | N/A | A | 1,471 | N/A | B |
| Marina Blvd. to Washington Av. | Mainline | 6,153 | 21.0 | C | 7,508 | 26.1 | D |

Source: Kittelson & Associates, Inc., 2014.

¹ Volume = vehicles per hour (vph)

² Density = passenger car per mile per lane (pc/m/ln)

³ LOS = Level of Service

⁴ Marina Blvd. to Davis St. analyzed as a weaving section using the Leisch Method as described in the Caltrans Design Manual, May 7, 2012. The volume shown for this segment is the weaving volume.

Existing Intersection Levels of Service

Intersection turning movement volumes, lane configurations and traffic control were used to calculate the levels of service at the study intersections. As shown in Table 10, all study intersections operate at LOS D or better.

Table 10: Intersection Level of Service – Existing Conditions

| | North/South Street | East/West Street | Control | AM Peak Hour | | PM Peak Hour | | Saturday Midday Hour | | | |
|----|-------------------------------|-----------------------|------------|---------------------|-------|--------------|-------|----------------------|-------|--|--|
| | | | | Delay | LOS | Delay | LOS | Delay | LOS | | |
| 1 | Doolittle Drive (SR-61) | Davis Street (SR-112) | Signalized | 24.8 | C | 20.1 | C | 18.2 | B | | |
| 2 | Phillips Lane | Davis Street (SR-112) | Signalized | 20.9 | C | 29.4 | C | | | | |
| 3 | Warden Avenue-Timothy Drive | Davis Street (SR-112) | Signalized | 19.2 | B | 29.5 | C | | | | |
| 4 | I-880 Southbound ramps | Davis Street (SR-112) | Signalized | 12.1 | B | 12 | B | | | | |
| 5 | I-880 Northbound ramps | Davis Street (SR-112) | Signalized | 13.7 | B | 16.8 | B | | | | |
| 6 | Doolittle Drive | Williams Street | Signalized | 19.5 | B | 16.1 | B | | | | |
| 7 | Westgate Parkway | Williams Street | Signalized | 16.4 | B | 25.5 | C | | | | |
| 8 | Merced Street | Williams Street | Signalized | 38.2 | D | 28.3 | C | | | | |
| 9 | Neptune Drive | Marina Boulevard | TWSC | 1.4 (9.7) | A (A) | 0.5 (11.3) | A (B) | | | | |
| 10 | Aurora Road | Marina Boulevard | AWSC | 11.4 (11.8) | B (B) | 10.8 (11.9) | B (B) | 9.7 (10.3) | A (B) | | |
| 11 | Doolittle Drive | Marina Boulevard | Signalized | 34.7 | C | 36 | D | 30.7 | C | | |
| 12 | Merced Street | Marina Boulevard | Signalized | 37.8 | D | 39.8 | D | 36.9 | D | | |
| 13 | Kaiser Access Driveway | Marina Boulevard | TWSC | Future Intersection | | | | | | | |
| 14 | I-880 Southbound ramps | Marina Boulevard | TWSC | 5.0 (17.9) | A (C) | 6.5 (21.1) | A (C) | 5.6 (16.1) | A (C) | | |
| 15 | I-880 Northbound ramps | Marina Boulevard | TWSC | 10.0 | A (D) | 4.9 (18.6) | A (C) | 3.7 (14.9) | A (B) | | |
| 16 | Wayne Avenue-Teagarden Street | Marina Boulevard | Signalized | 24.3 | C | 30.7 | C | | | | |
| 17 | Alvarado Street | Marina Boulevard | Signalized | 24.2 | C | 20.6 | C | | | | |
| 18 | San Leandro Boulevard | Marina Boulevard | Signalized | 44.8 | D | 36 | D | | | | |
| 19 | Monarch Bay Drive | Mulford Point Drive | AWSC | 7.7 (7.8) | A (A) | 8.5 (8.7) | A (A) | | | | |

| | North/South Street | East/West Street | Control | AM Peak Hour | | PM Peak Hour | | Saturday Midday Hour | |
|----|--------------------|----------------------|------------|--------------|-------|--------------|-------|----------------------|-------|
| | | | | Delay | LOS | Delay | LOS | Delay | LOS |
| 20 | Monarch Bay Drive | Pescador Point Drive | AWSC | 7.6 (7.7) | A (A) | 7.8 (7.9) | A (A) | | |
| 21 | Monarch Bay Drive | Fairway Drive | AWSC | 7.9 (8.1) | A (A) | 9.1 | A | | |
| 22 | Aurora Drive | Fairway Drive | AWSC | 8.2 (8.4) | A (A) | 8.5 (9.1) | A (A) | 8.1 (8.6) | A (A) |
| 23 | Doolittle Drive | Fairway Drive | Signalized | 16.8 | B | 16 | B | 14.5 | B |
| 24 | Merced Street | Fairway Drive | Signalized | 32.8 | C | 30.1 | C | 28.1 | C |
| 25 | Garfield Drive | Fairway Drive | Signalized | 3.0 | A | 3.7 | A | | |
| 26 | Miller Street | Fairway Drive | Signalized | 6.7 | A | 11.9 | B | | |
| 27 | Aladdin Avenue | Teagarden Street | Signalized | 12.4 | B | 14.5 | B | | |
| 28 | Aladdin Avenue | Alvarado Street | Signalized | 24.4 | C | 21.7 | C | | |
| 29 | Merced Street | Wells Fargo Driveway | Signalized | 1.2 | A | 4.4 | A | | |
| 30 | Merced Street | Republic Avenue | TWSC | 0.7 (25.0) | A (C) | 1.1 (26.3) | A (D) | | |
| 31 | Merced Street | West Avenue 140th | Signalized | 2.3 | A | 4.1 | A | | |

TWSC = Two-Way Stop Controlled

AWSC = All-Way Stop Controlled

LOS = Level of Service

Delay = Weighted average delay of all intersection approaches; the number in parentheses for stop-controlled intersection indicates the average delay on the worst approach.

Bold font indicates exceedance of LOS standard

Saturday LOS data were provided for a limited set of key intersections located near the Project site.

Source: Kittelson & Associates, 2014.

REGULATORY SETTING

This section summarizes applicable local and municipal plans and regulations that apply to the study area. This information provides a context for the impact discussion related to the Project's consistency with applicable policies, plans, laws and regulations.

CITY OF SAN LEANDRO

With the exception of State highways that are under Caltrans' jurisdiction, streets in the study area are generally under the jurisdiction of the City of San Leandro.

General Plan

The City's General Plan was adopted in 2002 and updated in 2011 with the certification of the city's Housing Element. The Transportation Element provides the policy framework for the regulation and development of transportation systems, balancing demands for moving people and goods within the city. It is comprehensive, addressing vehicular, pedestrian, bicycle, transit, truck, ferry and air transportation, as well as land use. The Plan contains the following goals, accompanied by specific policies and actions:

Goal 13: Coordinating Land Use and Transportation – Coordinate land use and transportation planning.

Goal 14: Bicycle and Pedestrian Circulation – Promote and accommodate alternative, environmentally-friendly methods of transportation, such as walking and bicycling.

Goal 15: Public Transportation – Ensure that public transportation is safe, convenient, and affordable and provides a viable alternative to driving.

Goal 16: Streets and Highways – Improve major transportation arteries for circulation in and around the City.

Goal 17: Neighborhood Traffic Management – Minimize the adverse effects of business, industrial, and through traffic on neighborhood streets.

Goal 18: Traffic Safety – Improve traffic safety and reduce the potential for accidents on San Leandro Streets.

Goal 19: Pedestrian-Oriented Streetscape – Encourage community design principles and standards which de-emphasize automobiles.

Goal 20: Interagency Coordination – Coordinate local transportation planning with other agencies and jurisdictions.

Bicycle and Pedestrian Master Plan

The City's Bicycle and Pedestrian Master Plan was adopted in February 2011. It contains an assessment of existing conditions for bicyclists and pedestrians and provides recommendations for biking and walking facilities, the interface between bicyclists and transit, and programs. It contains the following goals, accompanied by specific policies:

Goal 1: Support bicycling and walking and the development of a comprehensive bicycle and pedestrian transportation system as a viable alternative to the automobile.

Goal 2: Implement bicycle and pedestrian improvements maximizing the amount of funding for which San Leandro is eligible.

Goal 3: Develop a bicycle system that meets the needs of utilitarian and recreation users, helps reduce vehicle trips, and links residential neighborhoods with local and regional destinations.

Goal 4: Create a well-connected pedestrian environment by improving the walkability of all streets in San Leandro through the planning, implementing, and maintaining of pedestrian supportive infrastructure that meets the needs of all users.

Goal 5: Maximize bicycle and pedestrian access to transit.

Goal 6: Improve bicycle and pedestrian safety.

Goal 7: Develop detailed and ranked bicycle and pedestrian improvements.

Goal 8: Raise awareness of the benefits of walking and biking by developing a coordinated public outreach strategy to encourage bicycling and walking.

Goal 9: Develop land use policies and development standards that promote bicycling and walking for utilitarian and recreation trips.

ALAMEDA COUNTY TRANSPORTATION COMMISSION

The Alameda County Transportation Commission (Alameda CTC) coordinates transportation planning efforts throughout Alameda County and programs local, regional, state and federal funding for project implementation. It prepares the Congestion Management Program (CMP), a plan mandated by California law to describe the strategies to address congestion problems on the CMP network, which includes state highways and principal arterials. The CMP requires analysis of Metropolitan Transportation System (MTS) roadway and transit system and uses level of service standards as a means to measure congestion and has established LOS standards to determine how local governments meet the standards of the CMP.

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Caltrans is responsible for planning, design, construction and maintenance of all interstate freeways and state routes. It sets design standards that are often used by local governments. Interstate 880, a freeway in the study area, is under Caltrans jurisdiction, as are portions of Davis Street (State Route 112) and Doolittle Drive (State Route 61) from Davis Street to its north. Caltrans requirements are described in their Guide for Preparation of Traffic Impact Studies (Caltrans, 2002), which covers the information needed for Caltrans to review the impacts to State highway facilities; including freeway segments, on- and off-ramps, and signalized intersections.

TRANSPORTATION IMPACT ANALYSIS

The transportation impact analysis assesses how the study area's transportation system would operate with the implementation of the proposed Project. The potential impacts were identified based on a set of significance criteria based on the California Environmental Quality Act (CEQA) guidelines and set forth by the City of San Leandro, the California Department of Transportation, and the Alameda County Transportation Commission. These criteria are presented below after a discussion on traffic generated by the proposed Project.

PROJECT TRAFFIC

The proposed Project is comprised of a mix of residential and commercial land uses including 150,000 square feet of office space, a 200-room hotel, a 15,000-square-foot conference center, 354 residential units, two new restaurants, a café/boat rental store, and an array of public amenities. A new parking structure and several surface parking lots would be constructed to serve these uses and a new library/community building would replace the current Mulford Branch Library. The existing Marina Inn and Horatio's Restaurant on the project site are assumed to remain; while the El Torito Restaurant would be removed. Other structures and features that would be removed include restrooms, concession stands, docks and piers, harbor, San Leandro Yacht Club building, and Harbor master's office and fuel pump/dock. The Project is assumed to be fully constructed under all analysis conditions.

Project Trip Generation

Trip generation of the proposed Project is based upon information compiled by the Institute of Transportation Engineers (ITE) (*Trip Generation Manual, Ninth Edition, 2012* and *Trip Generation Manual, Ninth Edition, User Guide and Handbook, 2012*) with the exception of the conference center land use. Trips generated by the different project land uses during a typical weekday, and weekday morning (AM), weekday afternoon (PM) and Saturday midday peak hours were estimated using average rates or fitted curve equations published in the ITE manual. The use of rates or equations was selected based on guidelines in the ITE handbook. It is noted that Saturday trip generation is derived from ITE data for "Peak Hour of Generator" as opposed to "Peak Hour of Adjacent Street Traffic" for weekday and weekday AM and PM peak hour trip generation. However, the peak hour of the land uses would not likely occur at the same time; consequently, the Saturday trip estimate is likely to be high and the analysis tends to be conservative.

Data on conference center or similar category are not available in the ITE manual; therefore, the trip generation for the conference center was calculated based on a set of assumptions on the anticipated use of the facility. It is projected that the 15,000 square-foot facility has a 20-square foot per person capacity and the facility would operate at capacity during the weekday study periods and at half capacity during Saturday midday. Seventy-five percent of the guests would arrive or depart within the study peak hours in vehicles that have an average occupancy of two persons per vehicle.

Because of the attractive bayside setting and the amenities and improvements that would be provided as a part of the Project, it is anticipated that visitors would be attracted to the Project for recreation purposes. These trips are accounted in the park/open space category and represent the total acreage of community parks, open space, plazas, pedestrian piers and other like uses of the Project. The calculation did not take into account similar trips made by visitors to the existing marina that would also visit the new shoreline project area. Therefore, the analysis is potentially conservative.

Furthermore, existing trips generated by El Torito Restaurant were not subtracted when calculating the total number of trips generated by the Project even though the restaurant would be demolished with the implementation of the Project. The inclusion of such trips makes the analysis more conservative but an accurate number of existing trips cannot be ascertained making any removal potentially optimistic.

An adjustment was made to account for internal trips between different types of land uses within the project site. The internal trip adjustment was performed using procedures recommended by the Institute of Transportation Engineers for multi-use developments (*Trip Generation User Guide and Handbook*). Internal trips are trips that would occur between different land uses on the same site without accessing the external street system. Further details on the internal trip calculations may be found in Appendix 2.

In summary, the Project would potentially generate about 9,408 trips on a typical weekday of which 8,752 are new external vehicular trips. Of the external trips, 1,040 trips would occur during the weekday morning peak hour and 1,060 trips during the weekday evening peak hour. The Project is also projected to generate 909 trips during the Saturday midday hour of which 860 are new external trips. The project trip generation is presented in Table 11. The trip generation data were incorporated into the Alameda Countywide Travel Demand Model (Countywide Model) to project the number of background and project trips for analysis.

Project Trip Distribution and Assignment

The Countywide Model was also used to distribute project trips to and from the project site and to assign them onto the roadway network for each of the analysis conditions. Figure 7 shows the projected trip distribution percentages in the AM and PM peak hours. As San Leandro and adjacent communities develop, land uses and roadway network vary between the three different analysis conditions (2014, 2020 and 2035). Therefore, the distribution patterns of the project trips may also vary slightly. The pattern shown in Figure 7, as well as the number of trips generated by the proposed project at the study intersections presented in Figure 8 and Figure 9, are for the Long-Term Cumulative conditions (year 2035)

Table 11: Project Trip Generation

| Trip Generation Land Use Category | Amount | | Source | Trips Generated | | | | | | | | | |
|--------------------------------------|--------|-------|-----------|-----------------|--------------|------------|--------------|--------------|------------|--------------|------------|------------|------------|
| | | | | Weekday | AM Peak Hour | | | PM Peak Hour | | | Saturday | | |
| | | | | | In | Out | Total | In | Out | Total | In | Out | Total |
| Office | 150.0 | KSF | ITE (710) | 1,787 | 233 | 32 | 265 | 33 | 164 | 197 | 35 | 30 | 65 |
| Café | 8.0 | KSF | ITE (932) | 1,017 | 47 | 39 | 86 | 47 | 32 | 79 | 60 | 53 | 113 |
| Restaurant - Quality | 13.0 | KSF | ITE (931) | 1,169 | 6 | 5 | 11 | 65 | 32 | 97 | 83 | 58 | 141 |
| Conference Center | 15.0 | KSF | n/a | 1,500 | 281 | 50 | 331 | 50 | 281 | 331 | 140 | 25 | 165 |
| Hotel | 200 | Rooms | ITE (310) | 1,417 | 63 | 43 | 106 | 61 | 59 | 120 | 80 | 62 | 142 |
| Apartment | 159 | Units | ITE (220) | 1,087 | 16 | 66 | 82 | 68 | 37 | 105 | 42 | 42 | 84 |
| Townhome/Condo | 153 | Units | ITE (230) | 931 | 12 | 61 | 73 | 57 | 28 | 85 | 47 | 40 | 87 |
| Single-Family Detached | 42 | Units | ITE (210) | 473 | 10 | 29 | 39 | 30 | 18 | 48 | 25 | 21 | 46 |
| Park/Open Space | 14.48 | Acres | ITE (411) | 27 | 36 | 29 | 65 | 29 | 22 | 51 | 33 | 33 | 66 |
| Total Project Trips | | | | 9,408 | 704 | 354 | 1,058 | 440 | 673 | 1,113 | 545 | 364 | 909 |
| Internal Trips | | | | -656 | -9 | -8 | -18 | -26 | -25 | -53 | -24 | -24 | -49 |
| New External Trips | | | | 8,752 | 695 | 346 | 1,040 | 414 | 648 | 1,060 | 521 | 340 | 860 |

Source: Trip Generation Manual and User's Guide and Handbook 9th Edition; Kittelson & Associates, 2014.

¹ ITE's High-Turnover (Sit Down) Restaurant category is applied to the Café land use.

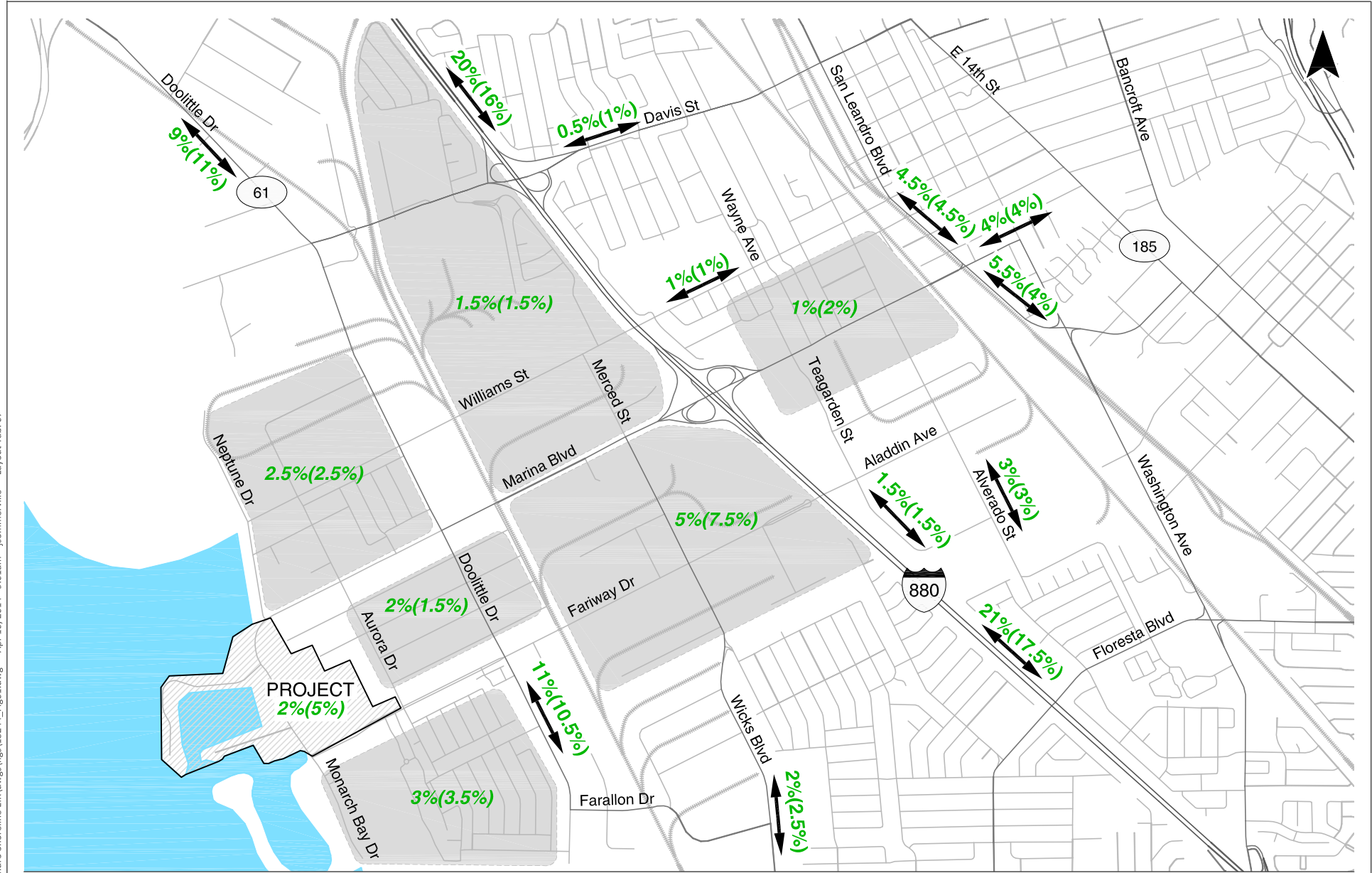
² The AM peak hour distribution percentage for the High-Turnover (Sit Down) Restaurant category is applied to the Quality Restaurant.

³ Data on conference center or similar category are not available in the ITE manual; therefore, the trip generation was calculated based on a set of assumptions on the anticipated use of the facility. It is projected that the 15,000 square-foot facility has a 20-square foot per person capacity and that 75 percent of guests would arrive within the AM and Saturday peak hours and depart within the PM peak hour in vehicles that have an average occupancy of two persons per vehicle.

⁴ Apartments are assumed to be for rent units; while other residential units are assumed to be for sale units.

⁵ ITE's City Park category is applied to the Park/Open Space land use.

⁶ Internal capture adjustments are made between Hotel and Conference Center uses, and between Restaurant, Residential/Hotel, and Office uses.



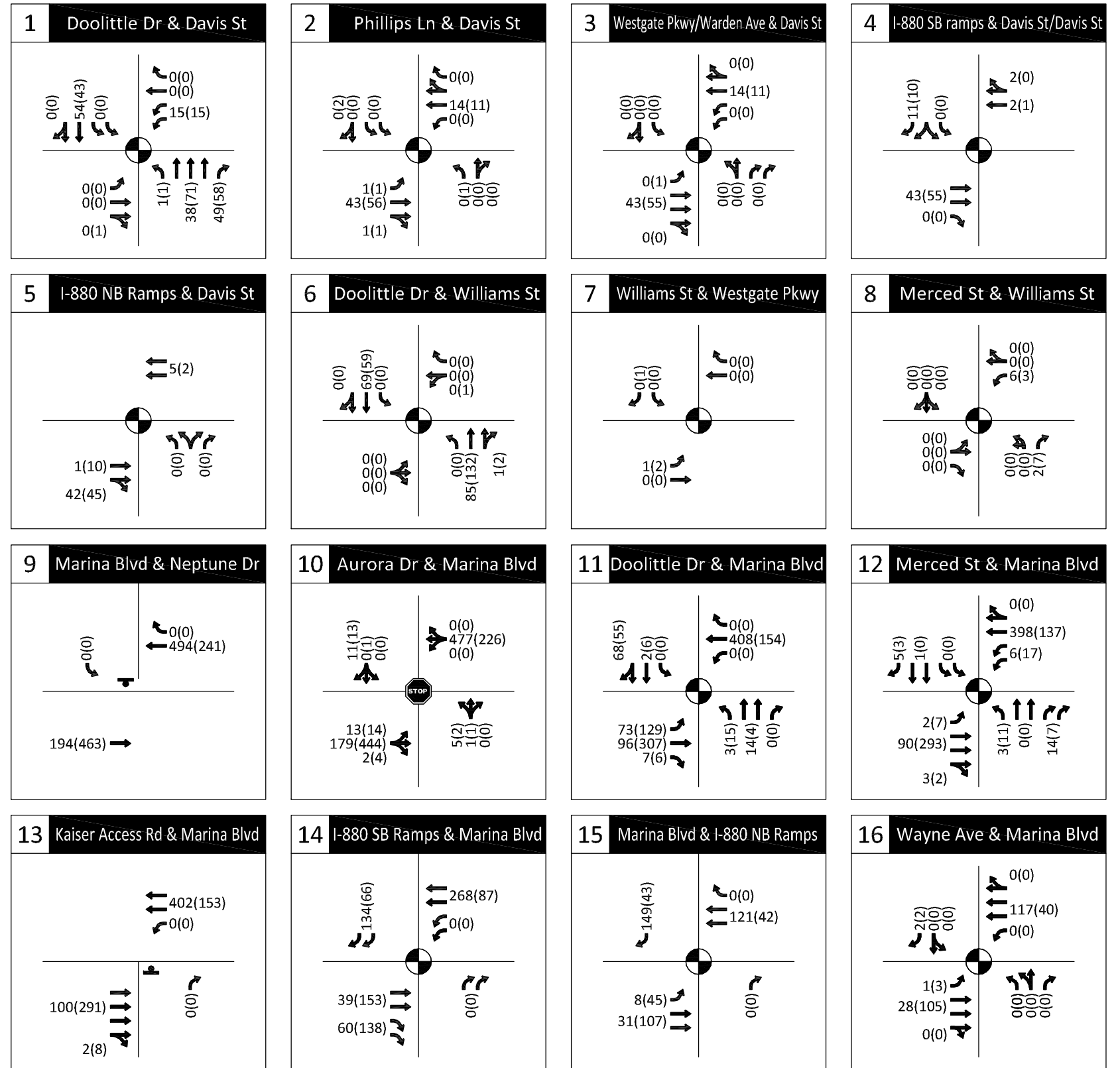
Inbound & Outbound AM(PM) Trip Percentage on Roadway
 Inbound & Outbound AM(PM) Trip Percentage to/from Shaded Area

Source: Year 2035 Alameda Countywide Travel Demand Model

Project Trip Distribution
AM & PM Peak Hours

Figure
7

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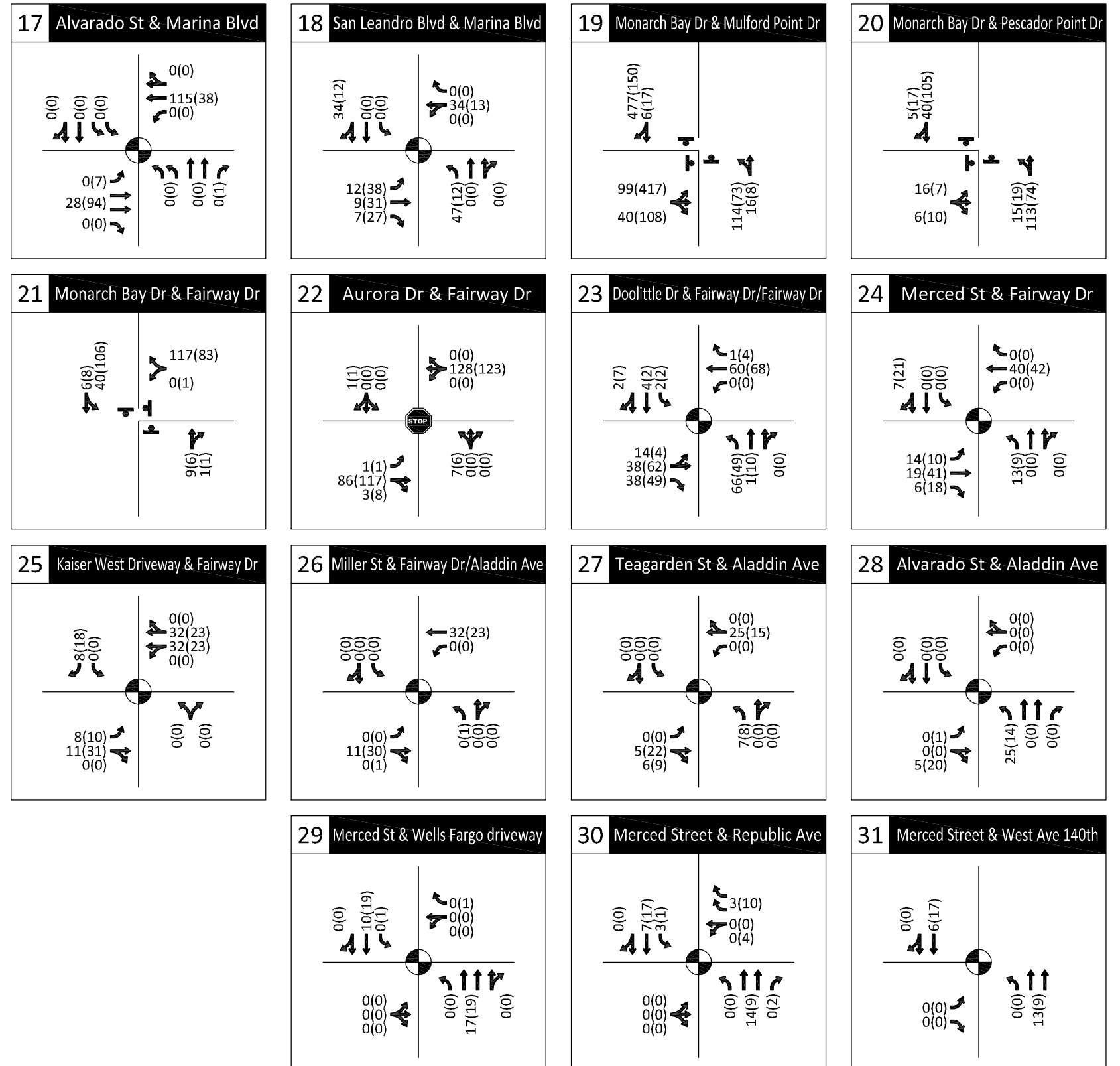


AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Project Only
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

Figure
 8

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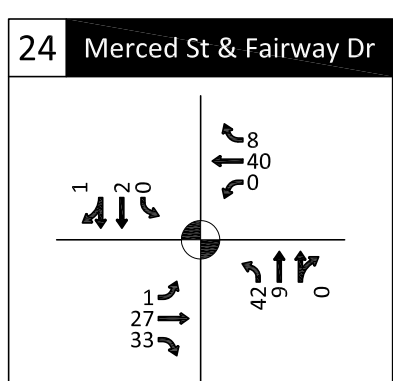
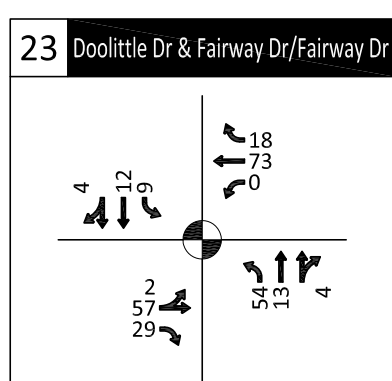
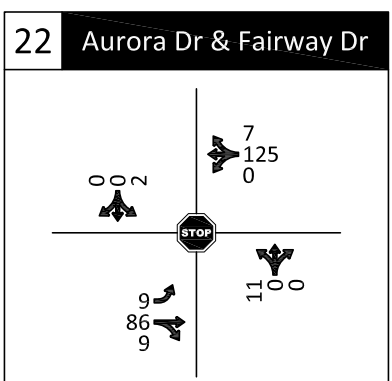
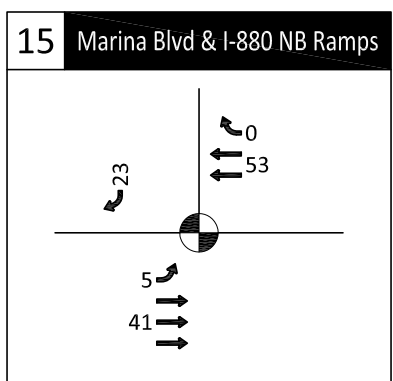
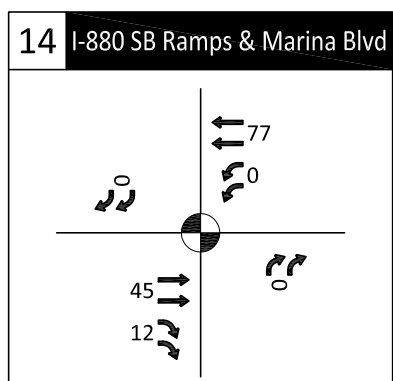
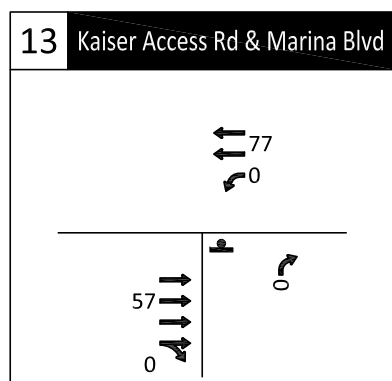
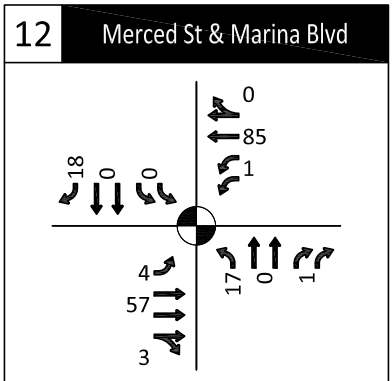
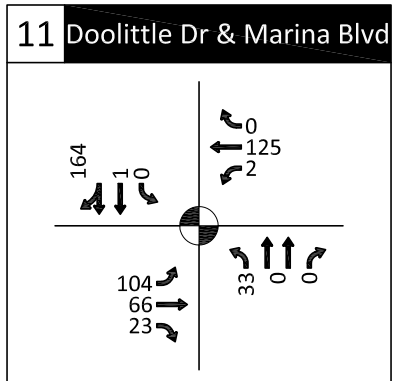
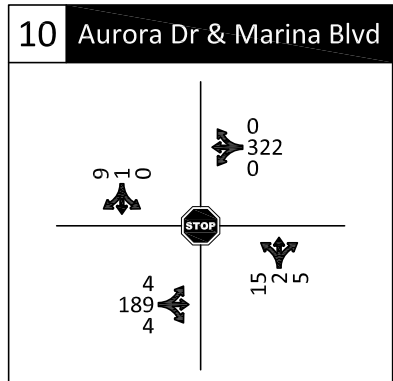
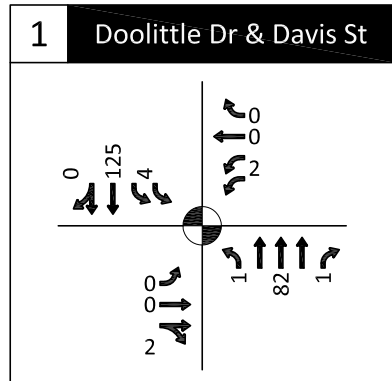
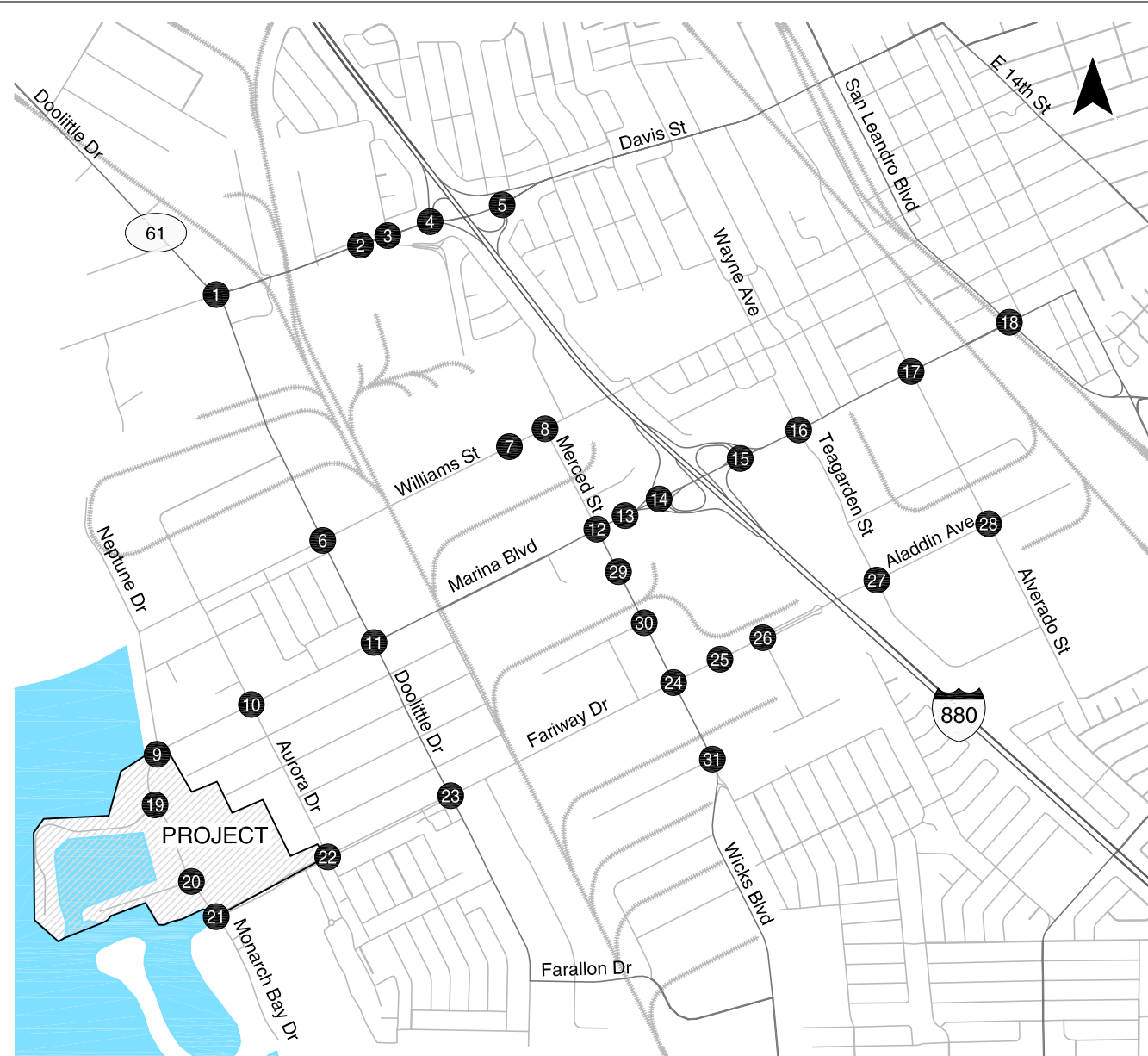


AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Project Only
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

Figure 8

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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Project Only
 Saturday Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

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SIGNIFICANCE CRITERIA

The project impact is considered to be significant if it would:

- a. 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 freeway, pedestrian and bicycle path, and mass transit.

Intersection Operations. San Leandro's General Plan contains level of service standards for intersection operations, whether an intersection is signalized or not. According to Policy 16.02, the minimum acceptable LOS is D. Page 4-20 of the General Plan allows for exceedance of LOS D "where road improvements are not possible because the necessary right-of-way does not exist and cannot be acquired without significant impacts on adjacent buildings and properties or the intersection or road segment is in a pedestrian district, such as Downtown, where the priority is on pedestrian, bicycle, and public transit access rather than vehicle traffic." For the purposes of this study, significant traffic impacts at intersections in the study area are identified if the Project causes:

- An intersection to operate at LOS E or F; or
- An increase in the volume-to-capacity (V/C) ratio of 0.05 or more for signalized intersections that operate at LOS E or F under No Project conditions; or
- An increase in average delay of more than 5 seconds on the worst approach for unsignalized intersections that operate at LOS E or F under No Project conditions.

Freeway Operations. As stated in the Caltrans Traffic Impact Study (TIS) Guide, "Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State highway facilities; however, Caltrans acknowledges that this may not always be feasible... If an existing State highway facility is operating at less than the appropriate target LOS, the existing Measure of Effectiveness (MOE) should be maintained." For the purposes of this study, significant traffic impacts on I-880 in the study area are identified if the Project causes:

- The operations of a freeway segment or ramp to deteriorate from LOS D or better to LOS E or F; or
- An increase in the amount of vehicle traffic on a freeway segment already operating at LOS E or F by more than one percent of the freeway segment's design capacity.

- b. Conflict with Alameda County Congestion Management Program, including, but not limited to level of service standards and travel demand measures, or other standards established by Alameda CTC for designed roadways or highways.

Autos. According to the CMP, the level of service standard for Metropolitan Transportation System (MTS) roadways, which include the CMP roadway network, is LOS E, except for those locations at LOS F in 1991. The MTS roadway facilities in the project area include I-880 and Doolittle Drive. Significant traffic impacts on MTS roadways in the study area are identified if the Project causes:

- The operations on MTS roadways to deteriorate from LOS E or better to LOS F with the exception of southbound I-880 between Hegenberger Road and Washington Avenue, where the standard is LOS F; or
- An increase in the V/C ratio on an MTS roadway already operating at LOS F by more than 0.03.

These standards have been included to address impacts along roadway segments currently operating under unacceptable levels and were developed based on professional judgment using a “reasonableness test” of daily fluctuations of traffic. In addition, a change in the V/C ratio of more than 0.03 has been found to be the threshold for which a perceived change in congestion is observed (the V/C ratio is calculated by comparing the peak hour link volume to the peak hour capacity of the road link). This change is equivalent to about one-half of the change from one level of service to the next.

Transit. The CMP requires consideration of the Project’s impact on MTS transit operators and riders. For the purpose of this study, significant transit impacts are identified if the Project causes:

- Congestion that degrades transit vehicle operations; or
 - Ridership to exceed existing transit capacity; or
 - Contribution of at least three percent of the total trips when the capacity is already exceeded under No Project conditions; or
 - Inadequate pedestrian connections between the project site and transit stops.
- c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- e. Result in inadequate emergency access.
- f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Although the project site is located only four miles from the Oakland International Airport, the nature of the Project is such that it would not result in a change in air traffic patterns. Therefore, this impact is not further evaluated in this study.

CIRCULATION SYSTEM PERFORMANCE

The performance of the analysis intersections and freeway locations was assessed for the period before the opening of the proposed Project but after the completion of currently constructing improvements and developments (Baseline Conditions) and for future planning years 2020 and 2035 (Near-Term Cumulative Conditions and Long-Term Cumulative Conditions). The process through which the background and project-generated traffic were developed are first described below; followed by impact assessments of each analysis conditions.

Traffic Volume Forecasting Approach

The Alameda Countywide Travel Demand Model was used to forecast traffic volumes for both background (No Project) and “plus Project” scenarios of all study conditions. The latest model is based on network assumptions from *Transportation 2035 Plan for the San Francisco Bay Area*, a regional transportation plan published by the Metropolitan Transportation Commission (MTC), and the *Alameda Countywide Transportation Plan*, and on socio-economic forecasts from *Projections 2009* published by the Association of Bay Area Governments (ABAG). The most recent integrated land use and transportation plan, *Plan Bay Area*, which was adopted in July 2013, has not yet been incorporated into the Countywide Model at the time of this analysis. The model forecasts weekday daily traffic and AM and PM peak hour traffic for links and intersections based on a standard 4-step travel demand model method. The model does not forecast Saturday conditions, so Saturday midday traffic was derived from the relationship between Saturday counts and weekday counts and then extrapolated to the weekday model forecasts. A detailed description of the forecasting process is provided below:

Assign existing model traffic. The model was implemented and refined to develop trip generation, trip distribution, mode choice and trip assignment for existing conditions in San Leandro. The model uses trip rates developed from the ITE manual for all land uses. Weekday AM and PM peak hour trips developed for existing uses in the model were compared to collected counts. Any difference between the two formed the basis for adjustment of future volumes.

Estimate background traffic. The model was used to project peak hour traffic conditions at the study intersections and roadway segments by generating data files that represents traffic movements under existing conditions and the three future background conditions without the Project: Baseline, Near-Term Cumulative (2020), and Long-Term Cumulative (2035). Each of these conditions is described in more details in their respective sections below.

Adjust future intersection volumes. To minimize model calibration error, future background model intersection volumes were post-processed to correlate model results with actual traffic counts. The automatic Incremental Adjustment Method with Furness was used to consider the difference between the 2013 model and 2013 counts. The adjustment method “factors” out the model error from the forecasted volumes. This method was developed by the Transportation Research Board as referenced in the National Cooperative Highway Research Program Report (NCHRP) 255: Highway Traffic Data for Urbanized Area Project Planning and Design (1982). Further manual adjustments were done in locations where new future facilities affected the automatic method of adjustment.

Add project traffic. Project land use was added to the model in terms of households, population employed residents, and employees, which was used to distribute daily person trips and assign peak hour traffic to and from the project site to the future roadway network. These input data are detailed by traffic analysis zones (TAZ) in Appendix 8. The method relies on the model’s built-in processes to determine trip redistributions as a result of the Project and related traffic congestion levels. The model was implemented for all future conditions based on changes to the network for each project scenario. Project traffic was isolated using a select zone process and factored to match ITE trip rates after a reduction of 5 percent was done to account for transit and non-motorized trips. Project traffic was then overlaid onto the background traffic for Baseline, Near-Term Cumulative and Long-Term Cumulative conditions to derive the volumes for the Plus Project scenarios.

Reasonableness check. The model output for all future project scenarios were then compared to the no-project model runs and the results were reviewed for reasonableness. Since the model employs congestion as a measure to assign traffic to the network, it may not add additional traffic to overloaded links if the roadways are too congested. Instead, it will redistribute some traffic to other routes. As a result, the volume differences on the network between the No Project and Plus Project runs may not necessarily be attributed entirely to project traffic. This process can sometimes lead to minor fluctuations or anomalies due to traffic redistribution. Some anomalies are factored out but the fluctuations would not change the overall results of the analysis.

Baseline Conditions

Intersection and freeway analysis of Baseline plus Project conditions was performed to determine the potential traffic impacts of the proposed Project in combination with the first phase of the Kaiser Medical Center on Marina Boulevard and the completion of the I-880 Marina Boulevard interchange improvement project. The first phase of the Kaiser Medical Center opened in mid-2014; while the interchange improvement is under construction and is anticipated to be completed in mid-2015 in time for the opening of the Shoreline development. Both the Kaiser and the interchange projects would substantially affect the transportation network in the project area; therefore, their inclusion in

the baseline analysis would more accurately reflect the transportation condition at the time when the Project opens. No other planned developments or roadway improvements are assumed in the Baseline Conditions.

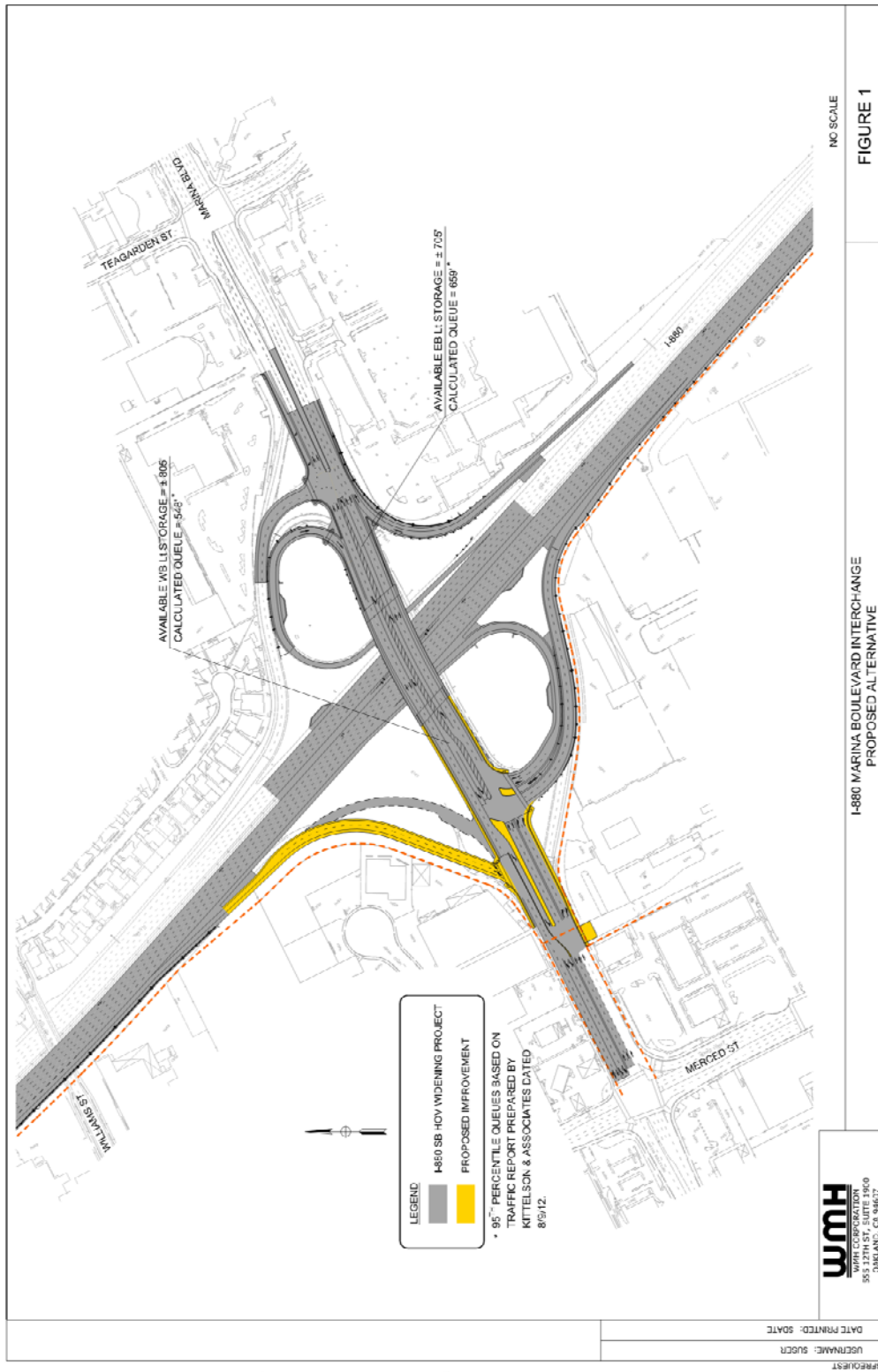
The Marina Boulevard interchange at I-880 would be reconfigured and be signalized at both the northbound and southbound ramps. A schematic of the interchange design is shown in Figure 10.

The Baseline Conditions analysis also incorporated key improvements to the existing roadway network that would be completed as part of the Kaiser Medical Center Phase 1. These improvements are detailed below:

- A new Kaiser access driveway on **Marina Boulevard** would be provided for limited right-turn inbound and right-turn outbound access
- **Republic Avenue** would be extended to the east onto the Kaiser campus and its intersection with Merced Street would be signalized.
- **Merced Street** would be restriped from the Wells Fargo Driveway to Republic Avenue to provide two lanes and one Class II bike lane in each direction and two southbound left-turn lanes at the Merced Street/Republic Avenue intersection.
- **Merced Street** would be widened from Republic Avenue to Fairway Drive to provide two northbound lanes, two southbound lanes, a center median as well as Class II bike lanes. A northbound left-turn lane would be provided at the Republic Avenue intersection and a southbound left-turn lane would be provided at the Fairway Drive intersection.
- **Fairway Drive** intersections of Miller Street and Garfield Drive would be signalized (these improvements have already been completed at the time of intersection volume counts were collected; therefore, they are included in existing conditions.)
- **Fairway Drive** would be widened to three lanes from Merced Street to Miller Street to provide two westbound lanes and one eastbound lane. Westbound left-turn lanes would be provided at Miller Street and at Merced Street, and eastbound left-turn lane would be provided at Garfield Drive and at Miller Street.

Vehicular traffic generated by the Kaiser Medical Center Phase 1 was added to the existing traffic volumes to derive the background traffic for the Baseline Conditions. The Kaiser traffic was developed using the Countywide Model based on land use information from the *Kaiser Permanente San Leandro Medical Center/Mixed-Use Retail Development Project Draft Environmental Impact Report* (January 2010). Traffic under the Baseline plus Project scenario was computed using the process described in the Analysis Approach section.

Figure 10: Marina Boulevard Interchange Concept Plan



Baseline Intersection Operations

The weekday and Saturday midday peak hour intersection turning movement volumes and lane configurations for Baseline Conditions with and without the Project are provided in Appendix 3. The information was used to calculate the level of service and identify potential impacts of the analysis intersections based on the City's significance thresholds. The level of service results are summarized in Table 12, Table 13 and Table 14 and the detailed calculation worksheets are provided in Appendix 4.

Signalized Intersections

Under Baseline scenario without the addition of project trips, one study signalized intersection is projected to operate below the City's standard of LOS D. The intersection of Aladdin Avenue and Alvarado Street (#28) would operate at LOS E with an average delay of 75.2 seconds. The addition of project traffic would cause the service level to further degrade to LOS F and increase the v/c ratio by 0.02.

The project traffic would cause two other signalized intersections to degrade to unacceptable levels where the intersections would operate at LOS D or better without the Project. The Doolittle Drive and Marina Boulevard intersection (#11) would degrade to LOS F during AM and PM peak hours; while the San Leandro Boulevard and Marina Boulevard intersection (#18) would degrade to LOS E in the PM peak hour.

Unsignalized Intersections

All unsignalized intersections are projected to operate within acceptable standards under Baseline No Project scenario. The addition of project traffic would cause two all-way stop controlled intersections to degrade to unacceptable levels where they would operate at LOS B or better without the Project. The Aurora Road and Marina Boulevard intersection (#10) would degrade to LOS F during the AM and PM peak hours; while the Monarch Bay Drive and Mulford Point Drive intersection (#19) within the project site would degrade to LOS F in the PM peak hour.

Baseline Intersection Impacts and Mitigation Measures

The Project's potential significant impacts were identified using the City's thresholds for intersections described in the Significance Criteria section. These impacts and mitigation measures to lessen any significant project impacts are discussed below.

Three signalized intersections and three unsignalized intersections would operate below acceptable standard under Baseline plus Project scenario. However, because the Project would only cause the v/c ratio to increase by 0.02 at the Aladdin Avenue and Alvarado Street intersection (#28), where it would already operate at substandard conditions without adding the project traffic, the project impact at this location is considered to be **less than significant**.

Table 12: Intersection Level of Service – Baseline Conditions – AM Peak Hour

| No | Street | Street | Control | Baseline | | Baseline + Project | | Change V/C or Delay | After Mitigation | |
|----|------------------------|-------------------|---------|-------------|----------|--------------------|----------|---------------------------|------------------|----------|
| | | | | Delay | LOS | Delay | LOS | | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 26.6 | C | 26.8 | C | | 26.8 | C |
| 2 | Phillips Ln | Davis St (SR-112) | Sig | 20.0 | B | 20.0 | C | | 20.0 | C |
| 3 | Warden Av-Timothy Dr | Davis St (SR-112) | Sig | 19.7 | B | 19.7 | B | | 19.7 | B |
| 4 | I-880 Southbound ramps | Davis St (SR-112) | Sig | 12.8 | B | 12.8 | B | | 12.8 | B |
| 5 | I-880 Northbound ramps | Davis St (SR-112) | Sig | 13.7 | B | 13.6 | B | | 13.6 | B |
| 6 | Doolittle Dr | Williams St | Sig | 19.7 | B | 21.0 | C | | 21.0 | C |
| 7 | Westgate Pkwy | Williams St | Sig | 15.6 | B | 15.8 | B | | 15.8 | B |
| 8 | Merced St | Williams St | Sig | 35.1 | D | 34.6 | C | | 34.6 | C |
| 9 | Neptune Dr | Marina Blvd | TWSC | 1.4 (9.7) | A (A) | 0.7 (18.3) | A (C) | | 0.7 (18.7) | A (C) |
| 10 | Aurora Rd* | Marina Blvd | AWSC | 9.7 | A | 76.1 | F | | 9.0/10.4 | A/B |
| 11 | Doolittle Dr | Marina Blvd | Sig | 34.6 | C | 75.7 | E | | 46.1 | D |
| 12 | Merced St | Marina Blvd | Sig | 35.4 | D | 44.9 | D | | 44.9 | D |
| 13 | Kaiser Drwy | Marina Blvd | TWSC | 0.1 (8.7) | A (A) | 0.1 (8.8) | A (A) | | 0.1 (8.8) | A (A) |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 18.9 | B | 18.9 | B | | 18.9 | B |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 17.1 | B | 18.2 | B | | 18.2 | B |
| 16 | Wayne Av-Teagarden St | Marina Blvd | Sig | 25.3 | C | 25.2 | C | | 25.2 | C |
| 17 | Alvarado St | Marina Blvd | Sig | 26.3 | C | 26.1 | C | | 26.1 | C |
| 18 | San Leandro Blvd | Marina Blvd | Sig | 44.7 | D | 54.8 | D | | 54.8 | D |
| 19 | Monarch Bay Dr | Mulford Point Dr | AWSC | 7.6 | A | 17.8 | C | | 7.3 | A |
| 20 | Monarch Bay Dr | Pescador Pt Dr | AWSC | 7.5 | A | 8.4 | A | | 8.4 | A |
| 21 | Monarch Bay Dr | Fairway Dr | AWSC | 7.9 | A | 8.8 | A | | 8.8 | A |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.3 | A | 10.0 | A | | 10.0 | A |
| 23 | Doolittle Dr | Fairway Dr | Sig | 16.8 | B | 18.5 | B | | 18.5 | B |
| 24 | Merced St | Fairway Dr | Sig | 32.4 | C | 33.2 | C | | 33.2 | C |
| 25 | Garfield Rd | Fairway Dr | Sig | 10.1 | B | 13.2 | B | | 13.2 | B |
| 26 | Miller St | Fairway Dr | Sig | 13.6 | B | 13.8 | B | | 13.8 | B |
| 27 | Aladdin Av | Teagarden St | Sig | 18.9 | B | 19.8 | B | | 19.8 | B |
| 28 | Aladdin Av | Alvarado St | Sig | 75.2 | E | 84.3 | F | 0.02 | 84.3 | F |
| 29 | Merced St | Wells Fargo Drwy | Sig | 2.2 | A | 2.2 | A | | 2.2 | A |
| 30 | Merced St | Republic Av | Sig | 19.0 | B | 19.1 | B | | 19.1 | B |
| 31 | Merced St | West Av 140th | Sig | 2.3 | A | 2.3 | A | | 2.3 | A |

Sig = Signalized

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled

LOS = Level of Service

Delay = Weighted average delay of all intersection approaches; the number in parentheses for stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

Bold font indicates substandard operations

Shaded cell indicates significant impact

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

Table 13: Intersection Level of Service – Baseline Conditions – PM Peak Hour

| No | Street | Street | Control | Baseline | | Baseline + Project | | Change | After Mitigation | |
|----|------------------------|-------------------|---------|-----------|------|--------------------|----------|--------------|------------------|-------|
| | | | | Delay | LOS | Delay | LOS | V/C or Delay | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 20.2 | C | 21.5 | C | | 21.5 | C |
| 2 | Phillips Ln | Davis St (SR-112) | Sig | 31.0 | C | 31.6 | C | | 31.6 | C |
| 3 | Warden Av-Timothy Dr | Davis St (SR-112) | Sig | 30.7 | C | 30.6 | C | | 30.6 | C |
| 4 | I-880 Southbound ramps | Davis St (SR-112) | Sig | 12.6 | B | 12.9 | B | | 12.9 | B |
| 5 | I-880 Northbound ramps | Davis St (SR-112) | Sig | 16.9 | B | 16.8 | B | | 16.8 | B |
| 6 | Doolittle Dr | Williams St | Sig | 16.7 | B | 18.2 | B | | 18.2 | B |
| 7 | Westgate Pkwy | Williams St | Sig | 26.0 | C | 26.1 | C | | 26.1 | C |
| 8 | Merced St | Williams St | Sig | 28.0 | C | 28.1 | C | | 28.1 | C |
| 9 | Neptune Dr | Marina Blvd | TWSC | 0.5(11.2) | A(B) | 0.4(23.3) | A(C) | | 0.4 (23.3) | A (C) |
| 10 | Aurora Rd* | Marina Blvd | AWSC | 10.1 | B | 70.8 | F | | 8.6/7.8 | A/A |
| 11 | Doolittle Dr | Marina Blvd | Sig | 34.9 | C | 62.5 | E | | 50.0 | D |
| 12 | Merced St | Marina Blvd | Sig | 38.5 | D | 43.4 | D | | 43.4 | D |
| 13 | Kaiser Drwy | Marina Blvd | TWSC | 0.1 (8.8) | A(A) | 0.1(9.2) | A(A) | | 0.1 (9.2) | A (A) |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 21.7 | C | 22.6 | C | | 22.6 | C |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 27.0 | C | 28.1 | C | | 28.1 | C |
| 16 | Wayne Av-Teagarden St | Marina Blvd | Sig | 32.4 | C | 32.8 | C | | 32.8 | C |
| 17 | Alvarado St | Marina Blvd | Sig | 22.0 | C | 21.7 | C | | 21.9 | C |
| 18 | San Leandro Blvd | Marina Blvd | Sig | 50.1 | D | 58.1 | E | | 44.9 | D |
| 19 | Monarch Bay Dr | Mulford Point Dr | AWSC | 8.4 | A | 52.4 | F | | 8.1 | A |
| 20 | Monarch Bay Dr | Pescador Pt Dr | AWSC | 7.7 | A | 8.8 | A | | 8.8 | A |
| 21 | Monarch Bay Dr | Fairway Dr | AWSC | 9.1 | A | 10.4 | B | | 10.4 | B |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.6 | A | 10.4 | B | | 10.4 | B |
| 23 | Doolittle Dr | Fairway Dr | Sig | 16.2 | B | 18.1 | B | | 18.1 | B |
| 24 | Merced St | Fairway Dr | Sig | 33.2 | C | 33.5 | C | | 33.5 | C |
| 25 | Garfield Rd | Fairway Dr | Sig | 9.9 | A | 11.5 | B | | 11.5 | B |
| 26 | Miller St | Fairway Dr | Sig | 19.8 | B | 20.0 | C | | 20.0 | C |
| 27 | Aladdin Av | Teagarden St | Sig | 17.4 | B | 17.6 | B | | 17.6 | B |
| 28 | Aladdin Av | Alvarado St | Sig | 26.6 | C | 26.6 | C | | 26.6 | C |
| 29 | Merced St | Wells Fargo Drwy | Sig | 3.8 | A | 3.8 | A | | 3.8 | A |
| 30 | Merced St | Republic Av | Sig | 20.2 | C | 20.1 | C | | 20.1 | C |
| 31 | Merced St | West Av 140th | Sig | 3.4 | A | 3.4 | A | | 3.4 | A |

Sig = Signalized

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled

LOS = Level of Service; v/c = volume to capacity ratio

Delay = Weighted average delay in seconds of all intersection approaches; the number in parentheses for two-way stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

Bold font indicates substandard operations

Shaded cell indicates significant impact

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

Table 14: Intersection Level of Service – Baseline Conditions – Saturday Midday Peak Hour

| No | Street | Street | Control | Baseline | | Baseline + Project | | Change V/C or Delay | After Mitigation | |
|----|------------------------|-------------------|---------|-----------|-------|--------------------|-------|---------------------------|------------------|-------|
| | | | | Delay | LOS | Delay | LOS | | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 18.6 | B | 18.5 | B | | 18.5 | B |
| 10 | Aurora Rd* | Marina Blvd | AWSC | 9.9 | A | 32.1 | D | | 7.0/7.7 | A/A |
| 11 | Doolittle Dr | Marina Blvd | Sig | 30.4 | C | 40.6 | D | | 39.8 | D |
| 12 | Merced St | Marina Blvd | Sig | 36.6 | D | 37.6 | D | | 37.6 | D |
| 13 | Kaiser Drwy | Marina Blvd | TWSC | 0.1 (8.7) | A (A) | 0.1 (8.8) | A (A) | | 0.1 (8.8) | A (A) |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 20.6 | C | 20.8 | C | | 20.8 | C |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 15.6 | B | 16.1 | B | | 16.1 | B |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.1 | A | 9.9 | A | | 9.9 | A |
| 23 | Doolittle Dr | Fairway Dr | Sig | 15.5 | B | 15.9 | B | | 15.9 | B |
| 24 | Merced St | Fairway Dr | Sig | 29.1 | C | 30.8 | C | | 30.8 | C |

Sig = Signalized

TWSC = Two-Way Stop Controlled

AWSC = All-Way Stop Controlled

LOS = Level of Service

v/c = volume to capacity ratio

Delay = Weighted average delay of all intersection approaches; the number in parentheses for two-way stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

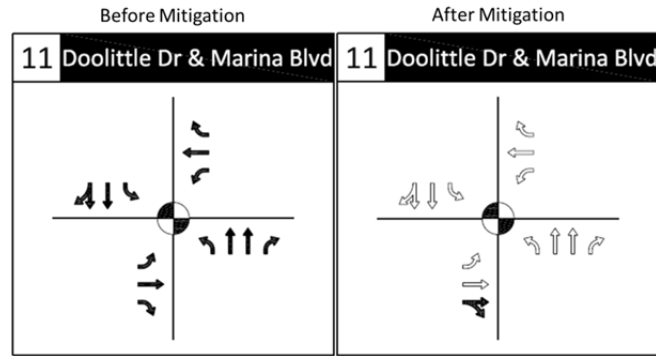
Signalized Intersections

Doolittle Drive and Marina Boulevard (#11). The Project would cause the intersection level of service to degrade from LOS C to LOS E in the AM and PM peak hours. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #1: Implementation of the following measures would improve the operation to LOS D and lessen the project impacts to **less than significant** during the AM and PM peak hours:

- Convert the existing eastbound right-turn lane on Marina Boulevard to a shared through-right turn lane to provide one left-turn lane, one through lane and one shared through-right turn lane on the eastbound approach
- Optimize the cycle length of the traffic signal, which does not operate in coordination with any other signal; therefore, the cycle length can be adjusted without affecting other signals in the system

The lane geometries before and after these mitigation measures are graphically shown in the figures below. In the “After Mitigation” figure, the mitigation measure is shown in solid black while lanes not being changed are shown in gray-scale.



San Leandro Boulevard and Marina Boulevard (#18). The addition of project traffic would cause the intersection level of service to degrade from LOS D to LOS E in the PM peak hour. Therefore, the project impact is considered to be **significant**.

Mitigation Measure #2: Implementation of the following measure would improve the operation to LOS D and lessen the project impacts to **less than significant** during the PM peak hour:

- Optimize the traffic signal timing splits

Unsignalized Intersections

Aurora Road and Marina Boulevard (#10). The addition of project traffic would cause the service level at this all-way stop controlled intersection to degrade from LOS A to LOS F in the AM peak hour and from LOS B to LOS F in the PM peak hour. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #3: Implementation of the following measure would improve the operation to LOS A in the AM and PM peak hours as well as the Saturday peak hour and lessen the project impacts to **less than significant**:

- Install a modern mini-roundabout that could be accommodated within the existing right-of-way⁵. Research has shown that roundabout-controlled intersections have similar low frequency and severity of crashes as all-way stop-controlled intersections. Further, the slower speed at roundabout also reduce the risk of injuries and fatalities for road users in the event of a crash. The operations and responsibilities of school crossing guards at a roundabout are similar to those posted at a stop-controlled intersection. A conceptual drawing of a mini-roundabout is provided in Figure 11.

⁵ Roundabout analysis was performed using Sidra software based on HCM 2010 methodology with Caltrans adjustments.

Figure 11 Preliminary Drawing of a Modern Mini-Roundabout



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Alternatively, implementation of the following measure would improve the operation to LOS B in the AM peak hour and LOS A in the PM and Saturday peak hours:

- Install a traffic signal as peak hour signal warrant is met

Monarch Bay Drive and Mulford Point Drive (#19). The addition of project traffic would cause the level of service at this all-way stop controlled intersection to degrade from LOS A to LOS F in the PM peak hour. Therefore, the project impact is considered to be **significant**.

Mitigation Measure #4: Implementation of the following measure would improve the operation to LOS A and lessen the project impacts to **less than significant** during the PM peak hour:

- Install a roundabout⁶

Baseline Freeway Operations

The weekday peak hour freeway operations are presented in Table 15 and detailed calculation worksheets are provided in Appendix 6. The results indicate that the mainline segment of I-880 northbound between Marina Boulevard and Davis Street would operate at LOS E during the AM peak hour under Baseline No Project conditions. The Project would add only add traffic volumes equivalent to 0.1 percent of the freeway segment's design capacity; therefore, the project impact is considered to be **less than significant**. All other freeway segments would operate at LOS D or better.

Near-Term Cumulative Conditions

The near-term cumulative conditions analysis projects how the study area's transportation system would operate with the full build-out of the Project in combination with growth and changes of the surrounding community by the year 2020. The analysis assumed certain planned roadway facilities would be completed and land use growth projected in the Countywide Model for this horizon year.

Planned Developments and Improvements

In addition to those identified under Baseline Conditions, the following major planned developments and roadways and transit improvements in the vicinity of the project site are included in this analysis based on discussions with City staff⁷:

⁶ Ibid.

⁷ Email from City of San Leandro Staff Reh-Lin Chen, Senior Transportation Engineer dated June 20, 2013 and subsequent discussions.

Table 15: Freeway Level of Service – Baseline Conditions – AM & PM Peak Hour

| Location | Type | Baseline | | | Baseline + Project | | |
|--------------------------------|--------------------|---------------------|----------------------|------------------|---------------------|----------------------|------------------|
| | | Volume ¹ | Density ² | LOS ³ | Volume ¹ | Density ² | LOS ³ |
| AM Peak Hour | | | | | | | |
| I-880 Northbound | | | | | | | |
| Washington Av. to Marina Blvd. | Mainline | 7,989 | 28.2 | D | 8,169 | 29.0 | D |
| Marina Blvd. to Davis St. | Mainline | 8,399 | 36.6 | E | 8,408 | 36.7 | E |
| | Weave ⁴ | 1,605 | N/A | C | 1,614 | N/A | C |
| Davis St. to 98th Av. | Mainline | 6,186 | 27.0 | D | 6,204 | 27.1 | D |
| I-880 Southbound | | | | | | | |
| 98th Av. to Davis St | Mainline | 5,810 | 25.1 | C | 5,932 | 25.7 | C |
| Davis St. to Marina Blvd. | Mainline | 6,616 | 26.3 | C | 6,626 | 26.4 | C |
| | Weave ⁴ | 1,196 | N/A | A | 1,205 | N/A | A |
| Marina Blvd. to Washington Av. | Mainline | 6,218 | 21.3 | C | 6,289 | 21.5 | C |
| PM Peak Hour | | | | | | | |
| I-880 Northbound | | | | | | | |
| Washington Av. to Marina Blvd. | Mainline | 7,241 | 25.0 | C | 7,323 | 25.3 | C |
| Marina Blvd. to Davis St. | Mainline | 7,644 | 34.7 | D | 7,657 | 34.9 | D |
| | Weave ⁴ | 2,168 | N/A | C | 2,181 | N/A | C |
| Davis St. to 98th Av. | Mainline | 5,864 | 25.4 | C | 5,896 | 25.5 | C |
| I-880 Southbound | | | | | | | |
| 98th Av. to Davis St | Mainline | 6,418 | 28.4 | D | 6,452 | 28.5 | D |
| Davis St. to Marina Blvd. | Mainline | 7,941 | 34.3 | D | 7,654 | 34.5 | D |
| | Weave ⁴ | 1,699 | N/A | B | 1,711 | N/A | B |
| Marina Blvd. to Washington Av. | Mainline | 7,692 | 26.9 | D | 7,866 | 27.6 | D |

¹ Volume = vehicles per hour (vph)

² Density = passenger car per mile per lane (pc/m/ln)

³ LOS = Level of Service

⁴ Marina Blvd. to Davis St. analyzed as a weaving section using the Leisch Method as described in the Caltrans Design Manual, May 7, 2012. The volume shown for this segment is the weaving volume.

- **Kaiser Permanente Medical Center and Mixed-Use Retail Development** would be fully completed. The Kaiser driveway on Marina Boulevard would be signalized and provide westbound left-turn access into the Kaiser site in addition to the eastbound right-turn inbound and northbound right-turn outbound access.
- Traffic signal timing at **Aladdin Avenue and Alvarado Street** Intersection would be optimized as part of the mitigation measures for the Kaiser project.
- **Interstate 880** would have a High Occupancy Vehicle (HOV) lane installed in the southbound direction from Hegenberger Road to the current HOV lane located south of Marina Boulevard.
- **Marina Boulevard**, from Teagarden Street to Alvarado Street, would be widened to six lanes (from the existing four lanes).

- **Alvarado Street**, from Marina Boulevard to Aladdin Avenue, would be widened to four lanes (from the existing two lanes with a two-way left turn lane).
- **Davis Street** (SR-112), between Warden Avenue-Timothy Drive to the I-880 interchange, would be widened to six lanes (from the existing four lanes).
- **Bus Rapid Transit (BRT)** would be in operation along International Boulevard and East 14th Street to the San Leandro BART station, which is the planned southern terminus of this enhanced bus service.

Near-Term Cumulative Intersection Operations

The weekday and Saturday midday peak hour intersection turning movement volumes and lane configurations for Near-Term Cumulative Conditions with and without the Project are provided in Appendix 3. The information was used to calculate the level of service and identify potential impacts of the analysis intersections based on the City's significance thresholds. The level of service results are summarized in Table 16, Table 17 and Table 18 and the detailed calculation worksheets are provided in Appendix 4.

Signalized Intersections

Under Near-Term Cumulative No Project scenario, two signalized intersections are projected to operate below the City's standard of LOS D. The intersection of I-880 southbound ramps at Marina Boulevard (#14) would operate at LOS E with an average delay of 72.5 seconds and the intersection of San Leandro Boulevard and Marina Boulevard (#18) would operate at LOS F with an average delay of 180.8 seconds in the PM peak hour. The addition of project traffic would cause the v/c ratio to increase by 0.07 at both intersections. Furthermore, the project traffic would also cause the operations at these two intersections to degrade below standard during other analysis periods when they would operate acceptably without the Project. The I-880 southbound ramps intersection (#14) would degrade to LOS E during both AM and Saturday peak hours and the San Leandro Boulevard intersection (#18) would degrade to LOS E in the AM peak hour.

The project traffic would also cause the intersections of Doolittle Drive and Marina Boulevard intersection (#11) during the weekday analysis periods and the Aladdin Avenue and Alvarado Street (#28) intersections during the PM peak hour to deteriorate to substandard operations.

Unsignalized Intersections

All unsignalized intersections are projected to operate at acceptable levels under Near-Term Cumulative No Project scenario but the project generated traffic would cause two of the all-way stop-controlled intersections to degrade to substandard levels. Similar to Baseline Conditions, the Aurora Road and Marina Boulevard intersection (#10) would operate at LOS F during all three analysis periods and the Monarch Bay Drive and Mulford Point Drive intersection (#19) would degrade to LOS F during the PM peak hour with the addition of project traffic.

Table 16: Intersection Level of Service – Near Term Cumulative Conditions – AM Peak Hour

| No | Street | Street | Control | Near Term | | Near Term+Proj | | Change V/C or Delay | After Mitigation | |
|----|------------------------|-------------------|---------|------------|------|----------------|----------|---------------------------|------------------|----------|
| | | | | Delay | LOS | Delay | LOS | | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 31.2 | C | 31.6 | C | | 31.6 | C |
| 2 | Phillips Ln | Davis St (SR-112) | Sig | 18.4 | B | 18.5 | B | | 18.5 | B |
| 3 | Warden Av-Timothy Dr | Davis St (SR-112) | Sig | 19.6 | B | 19.4 | B | | 19.4 | B |
| 4 | I-880 Southbound ramps | Davis St (SR-112) | Sig | 14.2 | B | 14.2 | B | | 14.2 | B |
| 5 | I-880 Northbound ramps | Davis St (SR-112) | Sig | 14.5 | B | 14.5 | B | | 14.5 | B |
| 6 | Doolittle Dr | Williams St | Sig | 24.0 | C | 28.8 | C | | 28.8 | C |
| 7 | Westgate Pkwy | Williams St | Sig | 16.0 | B | 16.0 | B | | 16.0 | B |
| 8 | Merced St | Williams St | Sig | 29.3 | C | 29.1 | C | | 29.1 | C |
| 9 | Neptune Dr | Marina Blvd | TWSC | 1.3 (10.0) | A(B) | 1.0 (21.8) | A (C) | | 1.0(21.8) | C |
| 10 | Aurora Rd* | Marina Blvd | AWSC | 9.9 | A | 75.7 | F | | 9.0/10.7 | A/B |
| 11 | Doolittle Dr | Marina Blvd | Sig | 39.2 | D | 93.8 | F | | 54.9 | D |
| 12 | Merced St | Marina Blvd | Sig | 37.4 | D | 54.8 | D | | 54.8 | D |
| 13 | Kaiser Drwy | Marina Blvd | Sig | 6.6 | A | 6.8 | A | | 6.8 | A |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 38.6 | D | 59.8 | E | | 26.8 | C |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 15.5 | B | 16.5 | B | | 16.5 | B |
| 16 | Wayne Av-Teagarden St | Marina Blvd | Sig | 27.0 | C | 26.4 | C | | 26.9 | C |
| 17 | Alvarado St | Marina Blvd | Sig | 24.0 | C | 26.1 | C | | 28.6 | C |
| 18 | San Leandro Blvd | Marina Blvd | Sig | 53.2 | D | 66.8 | E | | 66.8 | E |
| 19 | Monarch Bay Dr | Mulford Point Dr | AWSC | 7.6 | A | 17.4 | C | | 7.3 | A |
| 20 | Monarch Bay Dr | Pescador Pt Dr | AWSC | 7.5 | A | 8.4 | A | | 8.4 | A |
| 21 | Monarch Bay Dr | Fairway Dr | AWSC | 7.9 | A | 8.8 | A | | 8.8 | A |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.4 | A | 10.2 | B | | 10.2 | B |
| 23 | Doolittle Dr | Fairway Dr | Sig | 16.7 | B | 18.6 | B | | 18.6 | B |
| 24 | Merced St | Fairway Dr | Sig | 33.1 | C | 34.6 | C | | 34.6 | C |
| 25 | Garfield Rd | Fairway Dr | Sig | 11.8 | B | 7.2 | A | | 7.2 | A |
| 26 | Miller St | Fairway Dr | Sig | 17.6 | B | 18.9 | B | | 18.9 | B |
| 27 | Aladdin Av | Teagarden St | Sig | 37.5 | D | 44.1 | D | | 44.1 | D |
| 28 | Aladdin Av | Alvarado St | Sig | 36.7 | D | 39.3 | D | | 25.3 | C |
| 29 | Merced St | Wells Fargo Drwy | Sig | 1.0 | A | 1.0 | A | | 1.0 | A |
| 30 | Merced St | Republic Av | Sig | 10.0 | B | 10.3 | B | | 10.3 | B |
| 31 | Merced St | West Av 140th | Sig | 1.9 | A | 1.9 | A | | 1.9 | A |

Sig = Signalized

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled

LOS = Level of Service

Delay = Weighted average delay of all intersection approaches; the number in parentheses for stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

Bold font indicates substandard operations

Highlighted cell indicates significant impact

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

Table 17: Intersection Level of Service – Near Term Cumulative Conditions – PM Peak Hour

| No | Street | Street | Control | Near Term | | Near Term+Proj | | Change | After Mitigation | |
|----|------------------------|-------------------|---------|--------------|----------|----------------|----------|--------------|------------------|----------|
| | | | | Delay | LOS | Delay | LOS | V/C or Delay | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 22.0 | C | 24.9 | C | | 24.9 | C |
| 2 | Phillips Ln | Davis St (SR-112) | Sig | 37.3 | D | 39.2 | D | | 39.2 | D |
| 3 | Warden Av-Timothy Dr | Davis St (SR-112) | Sig | 36.8 | D | 39.3 | D | | 39.3 | D |
| 4 | I-880 Southbound ramps | Davis St (SR-112) | Sig | 13.8 | B | 14.1 | B | | 14.1 | B |
| 5 | I-880 Northbound ramps | Davis St (SR-112) | Sig | 17.3 | B | 17.2 | B | | 17.2 | B |
| 6 | Doolittle Dr | Williams St | Sig | 17.2 | B | 18.4 | B | | 18.4 | B |
| 7 | Westgate Pkwy | Williams St | Sig | 29.5 | C | 29.6 | C | | 29.6 | C |
| 8 | Merced St | Williams St | Sig | 26.2 | C | 26.2 | C | | 26.2 | C |
| 9 | Neptune Dr | Marina Blvd | TWSC | 0.5 (11.6) | A (B) | 0.7 (30.4) | A (D) | | 0.7 (30.4) | A (D) |
| 10 | Aurora Rd * | Marina Blvd | AWSC | 10.2 | B | 66.1 | F | | 8.4/9.4 | A/A |
| 11 | Doolittle Dr | Marina Blvd | Sig | 35.9 | D | 73.1 | E | | 47.9 | D |
| 12 | Merced St | Marina Blvd | Sig | 39.1 | D | 49.2 | D | | 49.2 | D |
| 13 | Kaiser Drwy | Marina Blvd | Sig | 21.6 | C | 23.2 | C | | 23.2 | C |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 72.5 | E | 87.6 | F | 0.07 | 38.8 | D |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 22.0 | C | 24.8 | C | | 24.8 | C |
| 16 | Wayne Av-Teagarden St | Marina Blvd | Sig | 33.2 | C | 32.8 | C | | 32.6 | C |
| 17 | Alvarado St | Marina Blvd | Sig | 45.4 | D | 50.4 | D | | 54.3 | D |
| 18 | San Leandro Blvd | Marina Blvd | Sig | 180.8 | F | 192.4 | F | 0.07 | 192.4 | F |
| 19 | Monarch Bay Dr | Mulford Pt Dr | AWSC | 8.5 | A | 52.9 | F | | 8.1 | A |
| 20 | Monarch Bay Dr | Pescador Pt Dr | AWSC | 7.8 | A | 8.9 | A | | 8.9 | A |
| 21 | Monarch Bay Dr | Fairway Dr | AWSC | 9.1 | A | 10.7 | B | | 10.7 | B |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.7 | A | 11.0 | B | | 11.0 | B |
| 23 | Doolittle Dr | Fairway Dr | Sig | 17.3 | B | 19.4 | B | | 19.4 | B |
| 24 | Merced St | Fairway Dr | Sig | 35.0 | C | 36.5 | D | | 36.5 | D |
| 25 | Garfield Rd | Fairway Dr | Sig | 15.7 | B | 12.3 | B | | 12.3 | B |
| 26 | Miller St | Fairway Dr | Sig | 26.5 | C | 27.4 | C | | 27.4 | C |
| 27 | Aladdin Av | Teagarden St | Sig | 32.4 | C | 35.3 | D | | 35.3 | D |
| 28 | Aladdin Av | Alvarado St | Sig | 54.2 | D | 57.1 | E | | 36.0 | D |
| 29 | Merced St | Wells Fargo Drwy | Sig | 3.6 | A | 3.8 | A | | 3.8 | A |
| 30 | Merced St | Republic Av | Sig | 21.3 | C | 21.3 | C | | 21.3 | C |
| 31 | Merced St | West Av 140th | Sig | 3.2 | A | 3.2 | A | | 3.2 | A |

Sig = Signalized LOS = Level of Service

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled

Delay = Weighted average delay in seconds of all intersection approaches; the number in parentheses for two-way stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

Bold font indicates substandard operations

Highlighted cell indicates significant impact

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

Table 18: Intersection Level of Service – Near Term Cumulative Conditions – Saturday Midday Peak Hour

| No | Street | Street | Control | Near Term | | Near Term+Proj | | Change V/C or Delay | After Mitigation | |
|----|------------------------|-------------------|---------|-----------|-----|----------------|----------|---------------------|------------------|-----|
| | | | | Delay | LOS | Delay | LOS | | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 19.3 | B | 19.2 | B | | 19.2 | B |
| 10 | Aurora Rd* | Marina Blvd | AWSC | 10.1 | B | 35.6 | E | | 7.1/7.8 | A/A |
| 11 | Doolittle Dr | Marina Blvd | Sig | 31.9 | C | 45.0 | D | | 44.0 | D |
| 12 | Merced St | Marina Blvd | Sig | 36.8 | D | 37.6 | D | | 37.6 | D |
| 13 | Kaiser Drwy | Marina Blvd | Sig | 14.3 | B | 14.5 | B | | 14.5 | B |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 53.0 | D | 57.1 | E | | 20.3 | C |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 14.2 | B | 14.6 | B | | 14.6 | B |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.2 | A | 10.1 | B | | 10.1 | B |
| 23 | Doolittle Dr | Fairway Dr | Sig | 15.3 | B | 16.2 | B | | 16.2 | B |
| 24 | Merced St | Fairway Dr | Sig | 34.0 | C | 36.6 | D | | 36.6 | D |

Sig = Signalized

TWSC = Two-Way Stop Controlled

AWSC = All-Way Stop Controlled

LOS = Level of Service

Delay = Weighted average delay of all intersection approaches; the number in parentheses for two-way stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

Bold font indicates substandard operations

Highlighted cell indicates significant impact

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

Near-Term Cumulative Intersection Impacts and Mitigation Measures

The Project’s potential significant impacts were identified using the City’s thresholds for intersections described in the Significance Criteria section. These impacts and mitigation measures to lessen any significant project impacts under Near-Term Cumulative conditions are discussed below.

Four signalized intersections and two unsignalized intersections would operate below acceptable standard under Near-Term Cumulative plus Project scenario. The project impacts are considered to be significant at all six intersections.

Signalized Intersections

Doolittle Drive and Marina Boulevard (#11). The addition of project traffic would cause the intersection level of service to degrade from LOS D to LOS F in the AM and PM peak hours. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #5: Implement Mitigation Measure #1 for the eastbound approach identified under the Baseline condition section would improve the operations to LOS D and lessen the cumulative impacts to **less than significant** during the AM and PM peak hours.

I-880 southbound ramps and Marina Boulevard (#14). The addition of project traffic would cause the operations to degrade from LOS D to LOS E in the AM and Saturday peak hours; and would exacerbate the substandard operations to further degrade the service levels from LOS E to LOS F in the PM peak hour and cause the v/c ratio to increase by 0.07. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #6: Implementation of the following measures would improve the operations to LOS C in the AM and Saturday peak hours and to LOS D in the PM peak hour and lessen the project impacts to less than significant:

- Modify the traffic signal to a two-phase operation to provide non-conflicting:
 - eastbound and westbound through movements on Marina Boulevard during the first phase
 - southbound right-turn, northbound right-turn and westbound left-turn movements during the second phase
- Prohibit westbound U-turn movements

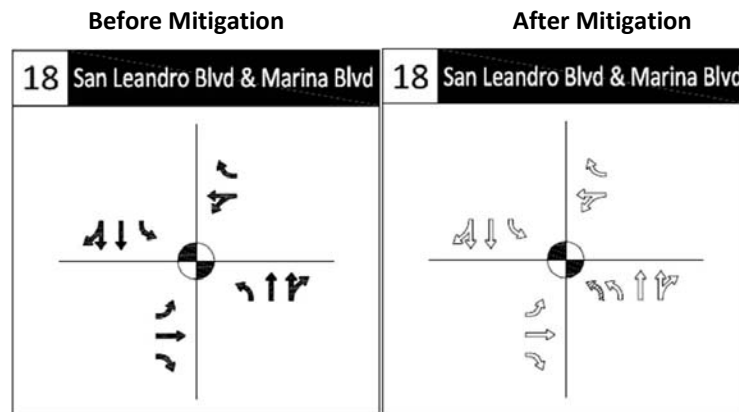
However, because this ramp intersection is under Caltrans' jurisdiction, the implementation and timing of the mitigation measures are not under the City's control, therefore, the impact remains **significant and unavoidable**.

San Leandro Boulevard and Marina Boulevard (#18). The project traffic would cause the operations to degrade from LOS D to LOS E in the AM peak hour; and would exacerbate the substandard LOS F operations in the PM peak hour and cause the v/c ratio to increase by 0.07. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #7: Implementation of the following measures identified in the Kaiser Permanente San Leandro Medication Center/Mixed-Use Retail Development Project EIR would be required to fully mitigate the near term cumulative impact during the AM and PM peak hours:

- Add a northbound left-turn lane on San Leandro Boulevard to provide two left-turn lanes, one through lane and one shared through-right turn lane
- Restripe lanes on the west leg to provide two corresponding receiving lanes

The lane geometries before and after implementation of the measures are shown in the figure below. However, the available right-of-way on the northbound approach would not be sufficient to accommodate the two left-turn lanes, one through lane and one shared through-right turn lane as well as a bike lane. Therefore, this measure is considered to be infeasible and the project impact remains **significant and unavoidable**.



Aladdin Avenue and Alvarado Street (#28). The addition of project traffic would cause the level of service at this intersection to degrade from LOS D to LOS E in the PM peak hour. Therefore, the project impact is considered to be **significant**.

Mitigation Measure #8: Implementation of the following measure would improve the operations to LOS D in the PM peak hour and lessen the project impacts to **less than significant**:

- Optimize cycle length of the traffic signal, which does not operate in coordination with any other signal

Unsignalized Intersections

Aurora Road and Marina Boulevard (#10). The addition of project traffic would cause the level of service at this all-way stop controlled intersection to degrade from LOS A to LOS F in the AM peak hour and from LOS B to LOS F in the PM peak hour and from LOS B to LOS E in the Saturday peak hour. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #9: Implement Mitigation Measure #3 identified under the Baseline condition section by installing a mini-roundabout would improve the operations to LOS A in all three peak hours and lessen the cumulative impacts to **less than significant**.

Alternatively, installation of a traffic signal would also improve the operation to LOS B in the AM peak hour and LOS A in the PM and Saturday peak hours and lessen the cumulative impacts to **less than significant**. Peak hour traffic signal warrant is met for the AM peak hour.

Monarch Bay Drive and Mulford Point Drive (#19). The addition of project traffic would cause the level of service at this all-way stop controlled intersection to degrade from LOS A to LOS F in the PM peak hour. Therefore, the project impact is considered to be **significant**.

Mitigation Measure #10: Implement Mitigation Measure #4 identified under the Baseline condition section by installing a roundabout would improve the operations to LOS A in the PM peak hour and lessen the cumulative impacts to **less than significant**.

Near-Term Cumulative Freeway Operations

The weekday peak hour freeway operations are presented in Table 19 and the detailed calculation worksheets are provided in Appendix 6.

Table 19: Freeway Level of Service – Near Term Cumulative Conditions – AM & PM Peak Hour

| Location | Type | Near Term | | | Near Term + Project | | |
|--------------------------------|--------------------|---------------------|----------------------|------------------|---------------------|----------------------|------------------|
| | | Volume ¹ | Density ² | LOS ³ | Volume ¹ | Density ² | LOS ³ |
| AM Peak Hour | | | | | | | |
| I-880 Northbound | | | | | | | |
| Washington Av. to Marina Blvd. | Mainline | 8,335 | 29.8 | D | 8,484 | 30.6 | D |
| Marina Blvd. to Davis St. | Mainline | 8,790 | 38.6 | E | 8,797 | 38.7 | E |
| | Weave ⁴ | 1,591 | N/A | C | 1,597 | N/A | C |
| Davis St. to 98th Av. | Mainline | 6,526 | 29.0 | D | 6,572 | 29.3 | D |
| I-880 Southbound | | | | | | | |
| 98th Av. to Davis St | Mainline | 6,994 | 24.0 | C | 7,130 | 24.6 | C |
| Davis St. to Marina Blvd. | Mainline | 6,837 | 27.0 | C | 6,844 | 27.0 | C |
| | Weave ⁴ | 1,097 | N/A | A | 1,103 | N/A | A |
| Marina Blvd. to Washington Av. | Mainline | 7,316 | 25.3 | C | 7,389 | 25.6 | C |
| PM Peak Hour | | | | | | | |
| I-880 Northbound | | | | | | | |
| Washington Av. to Marina Blvd. | Mainline | 8,034 | 28.4 | D | 8,095 | 28.7 | D |
| Marina Blvd. to Davis St. | Mainline | 8,254 | 37.3 | E | 8,292 | 37.7 | E |
| | Weave ⁴ | 1,994 | N/A | C | 2,031 | N/A | C |
| Davis St. to 98th Av. | Mainline | 6,440 | 28.5 | D | 6,511 | 28.9 | D |
| I-880 Southbound | | | | | | | |
| 98th Av. to Davis St | Mainline | 7,281 | 25.2 | C | 7,344 | 25.4 | C |
| Davis St. to Marina Blvd. | Mainline | 8,760 | 38.3 | E | 8,798 | 38.7 | E |
| | Weave ⁴ | 1,616 | N/A | B | 1,654 | N/A | B |
| Marina Blvd. to Washington Av. | Mainline | 8,359 | 30.0 | D | 8,504 | 30.7 | D |

¹ Volume = vehicles per hour (vph)

² Density = passenger car per mile per lane (pc/m/ln)

³ LOS = Level of Service

⁴ Marina Blvd. to Davis St. analyzed as a weaving section using the Leisch Method as described in the Caltrans Design Manual, May 7, 2012. The volume shown for this segment is the weaving volume.

Similar to Baseline Conditions, the results indicate that the mainline segment of I-880 northbound between Marina Boulevard and Davis Street would operate at LOS E in the AM peak hour under Near-Term Cumulative No Project conditions. The same segment would also operate at LOS E in the PM

peak hour. The Project would add traffic volume equivalent to only 0.09 percent of the freeway's mainline capacity in the AM peak hour and 0.2 percent in the PM peak hour. Furthermore, the mainline segment of I-880 southbound between Davis Street and Marina Boulevard would also operate at LOS E in the PM peak hour under No Project conditions and the Project would add traffic volume equivalent to 0.4 percent of the mainline capacity. Because the Project would not increase the traffic by more than one percent of the freeway's capacity at these locations, the project impacts are considered to be less than significant. All other study segments are projected to operate at LOS D or better.

Long-Term Cumulative Conditions

The Long-Term Cumulative Conditions analysis projects how the study area's transportation system would operate with the full build-out of the Project in combination with the growth and changes of the surrounding community by the year 2035.

Planned Developments and Improvements

The land use and roadway network assumptions for the Long-Term Cumulative Conditions are based on the Countywide Model for this horizon year. It includes all the planned developments and improvements identified under Baseline and Near-Term Cumulative Conditions and the full buildout of the Kaiser Medical Center. No other roadway improvements in the study area are included.

Long-Term Cumulative Intersection Operations

The peak hour intersection turning movement volumes and lane configurations for Long-Term Cumulative Conditions with and without the Project are provided in Appendix 3. The information was used to calculate the level of service and identify potential impacts of the analysis intersections based on the City's significance thresholds. The level of service results are summarized in Table 20, Table 21, and Table 22 and the detailed calculation worksheets are provided in Appendix 4.

Signalized Intersections

Under Long-Term Cumulative No Project scenario, seven signalized intersections are projected to operate below the City's standard of LOS D. Three of these intersections are located along Marina Boulevard. The I-880 southbound ramps intersection (#14) is projected to operate at LOS E in the PM and Saturday peak hours, the Alvarado Street intersection (#17) and the San Leandro Boulevard (#18) would operate at LOS F in the PM and AM peak hours, respectively. Two Davis Street intersections, at Phillips Lane (#2) and at Warden Avenue/Timothy Drive (#3), would both operate at LOS E in the PM peak hour. The Miller Street and Fairway Drive intersection (#26) would operate at LOS E in the PM peak hour and the Aladdin Avenue and Teagarden Street intersection (#27) would operate at LOS F in the AM peak hour.

Table 20: Intersection Level of Service – Long Term Cumulative Conditions – AM Peak Hour

| No | Street | Street | Control | Long Term | | Long Term+Proj | | Change | After Mitigation | |
|----|------------------------|-------------------|---------|--------------|----------|----------------|----------|--------------|------------------|----------|
| | | | | Delay | LOS | Delay | LOS | V/C or Delay | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 44.0 | D | 44.2 | D | | 44.2 | D |
| 2 | Phillips Ln | Davis St (SR-112) | Sig | 31.1 | C | 32.6 | C | | 32.6 | C |
| 3 | Warden Av-Timothy Dr | Davis St (SR-112) | Sig | 17.6 | B | 17.6 | B | | 17.6 | B |
| 4 | I-880 Southbound ramps | Davis St (SR-112) | Sig | 27.6 | C | 28.4 | C | | 28.4 | C |
| 5 | I-880 Northbound ramps | Davis St (SR-112) | Sig | 14.5 | B | 14.4 | B | | 14.4 | B |
| 6 | Doolittle Dr | Williams St | Sig | 21.3 | C | 23.2 | C | | 23.2 | C |
| 7 | Westgate Pkwy | Williams St | Sig | 16.6 | B | 16.8 | B | | 16.7 | B |
| 8 | Merced St | Williams St | Sig | 29.9 | C | 29.4 | C | | 30.1 | C |
| 9 | Neptune Dr | Marina Blvd | TWSC | 1.3 (10.0) | A (B) | 1.1 (25.2) | A (C) | | 1.1 (25.2) | A (C) |
| 10 | Aurora Rd* | Marina Blvd | AWSC | 10.0 | A | 81.2 | F | | 9.2/10.6 | A/B |
| 11 | Doolittle Dr | Marina Blvd | Sig | 38.0 | D | 94.6 | F | | 54.3 | D |
| 12 | Merced St | Marina Blvd | Sig | 53.7 | D | 65.1 | E | | 45.5 | D |
| 13 | Kaiser Drwy | Marina Blvd | Sig | 6.7 | A | 6.9 | A | | 6.9 | A |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 46.4 | D | 66.7 | E | | 33.3 | C |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 19.3 | B | 21.5 | C | | 21.5 | C |
| 16 | Wayne Av-Teagarden St | Marina Blvd | Sig | 28.8 | C | 26.0 | C | | 26.1 | C |
| 17 | Alvarado St | Marina Blvd | Sig | 28.7 | C | 35.3 | D | | 39.4 | D |
| 18 | San Leandro Blvd | Marina Blvd | Sig | 205.4 | F | 223.1 | F | 0.07 | 223.1 | F |
| 19 | Monarch Bay Dr | Mulford Point Dr | AWSC | 7.6 | A | 18.0 | C | | 7.3 | A |
| 20 | Monarch Bay Dr | Pescador Pt Dr | AWSC | 7.5 | A | 8.4 | A | | 8.4 | A |
| 21 | Monarch Bay Dr | Fairway Dr | AWSC | 7.9 | A | 8.8 | A | | 8.8 | A |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.3 | A | 10.1 | B | | 10.1 | B |
| 23 | Doolittle Dr | Fairway Dr | Sig | 17.0 | B | 18.8 | B | | 18.8 | B |
| 24 | Merced St | Fairway Dr | Sig | 33.1 | C | 34.7 | C | | 34.7 | C |
| 25 | Garfield Rd | Fairway Dr | Sig | 9.5 | A | 8.8 | A | | 8.8 | A |
| 26 | Miller St | Fairway Dr | Sig | 57.3 | E | 65.3 | E | 0.02 | 65.3 | E |
| 27 | Aladdin Av | Teagarden St | Sig | 97.6 | F | 106.0 | F | 0.03 | 106.0 | F |
| 28 | Aladdin Av | Alvarado St | Sig | 52.8 | D | 51.1 | D | | 51.1 | D |
| 29 | Merced St | Wells Fargo Drwy | Sig | 1.3 | A | 1.3 | A | | 1.3 | A |
| 30 | Merced St | Republic Av | Sig | 11.2 | B | 11.5 | B | | 11.5 | B |
| 31 | Merced St | West Av 140th | Sig | 1.9 | A | 2.0 | A | | 2.0 | A |

Sig = Signalized

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled

LOS = Level of Service

Delay = Weighted average delay of all intersection approaches; the number in parentheses for stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

Bold font indicates substandard operations

Highlighted cell indicates significant impact

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

Table 21: Intersection Level of Service – Long Term Cumulative Conditions – PM Peak Hour

| No | Street | Street | Control | Long Term | | Long Term+Proj | | Change | After Mitigation | |
|----|------------------------|-------------------|---------|--------------|-------|----------------|-------|--------------|------------------|-------|
| | | | | Delay | LOS | Delay | LOS | V/C or Delay | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 29.3 | C | 35.6 | D | | 35.6 | D |
| 2 | Phillips Ln | Davis St (SR-112) | Sig | 72.2 | E | 81.1 | F | 0.03 | 81.1 | F |
| 3 | Warden Av-Timothy Dr | Davis St (SR-112) | Sig | 58.0 | E | 63.6 | E | 0.01 | 63.6 | E |
| 4 | I-880 Southbound ramps | Davis St (SR-112) | Sig | 16.3 | B | 16.9 | B | | 16.9 | B |
| 5 | I-880 Northbound ramps | Davis St (SR-112) | Sig | 16.6 | B | 16.9 | B | | 16.9 | B |
| 6 | Doolittle Dr | Williams St | Sig | 19.6 | B | 21.2 | C | | 21.2 | C |
| 7 | Westgate Pkwy | Williams St | Sig | 31.1 | C | 31.3 | C | | 31.5 | C |
| 8 | Merced St | Williams St | Sig | 27.5 | C | 27.1 | C | | 32.7 | C |
| 9 | Neptune Dr | Marina Blvd | TWSC | 0.5 (11.7) | A (B) | 0.8 (34.2) | A (D) | | 0.5 (25.5) | A (D) |
| 10 | Aurora Rd* | Marina Blvd | AWSC | 10.3 | B | 67.0 | F | | 8.4/7.7 | A/A |
| 11 | Doolittle Dr | Marina Blvd | Sig | 39.0 | D | 91.2 | F | | 50.3 | D |
| 12 | Merced St | Marina Blvd | Sig | 44.2 | D | 63.8 | E | | 54.4 | D |
| 13 | Kaiser Drwy | Marina Blvd | Sig | 21.3 | C | 25.3 | C | | 25.3 | C |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 79.3 | E | 102.3 | F | 0.10 | 49.1 | D |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 33.9 | C | 41.7 | D | | 41.7 | D |
| 16 | Wayne Av-Teagarden St | Marina Blvd | Sig | 38.8 | D | 42.3 | D | | 42.3 | D |
| 17 | Alvarado St | Marina Blvd | Sig | 100.0 | F | 119.2 | F | 0.01 | 119.2 | F |
| 18 | San Leandro Blvd | Marina Blvd | Sig | 326.5 | F | 349.4 | F | 0.10 | 349.4 | F |
| 19 | Monarch Bay Dr | Mulford Point Dr | AWSC | 8.5 | A | 52.6 | F | | 8.1 | A |
| 20 | Monarch Bay Dr | Pescador Pt Dr | AWSC | 7.8 | A | 8.9 | A | | 8.9 | A |
| 21 | Monarch Bay Dr | Fairway Dr | AWSC | 9.0 | A | 10.6 | B | | 10.6 | B |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.7 | A | 11.1 | B | | 11.1 | B |
| 23 | Doolittle Dr | Fairway Dr | Sig | 18.4 | B | 20.4 | C | | 20.4 | C |
| 24 | Merced St | Fairway Dr | Sig | 45.9 | D | 49.6 | D | | 53.5 | D |
| 25 | Garfield Rd | Fairway Dr | Sig | 14.9 | B | 15.2 | B | | 15.2 | B |
| 26 | Miller St | Fairway Dr | Sig | 36.2 | D | 37.6 | D | | 37.6 | D |
| 27 | Aladdin Av | Teagarden St | Sig | 52.2 | D | 59.0 | E | | 37.0 | D |
| 28 | Aladdin Av | Alvarado St | Sig | 48.4 | D | 50.2 | D | | 50.2 | D |
| 29 | Merced St | Wells Fargo Drwy | Sig | 3.1 | A | 3.1 | A | | 4.6 | A |
| 30 | Merced St | Republic Av | Sig | 21.0 | C | 20.8 | C | | 26.0 | C |
| 31 | Merced St | West Av 140th | Sig | 3.1 | A | 3.2 | A | | 3.2 | A |

Sig = Signalized

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled

LOS = Level of Service

Delay = Weighted average delay in seconds of all intersection approaches; the number in parentheses for two-way stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

Bold font indicates substandard operations

Highlighted cell indicates significant impact

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

Table 22: Intersection Level of Service – Long Term Cumulative Conditions – Saturday Midday Peak Hour

| No | Street | Street | Control | Long Term | | Long Term+Proj | | Change V/C or Delay | After Mitigation | |
|----|------------------------|-------------------|---------|-------------|----------|----------------|----------|---------------------------|------------------|-----|
| | | | | Delay | LOS | Delay | LOS | | Delay | LOS |
| 1 | Doolittle Dr (SR-61) | Davis St (SR-112) | Sig | 21.2 | C | 21.3 | C | | 21.3 | C |
| 10 | Aurora Rd* | Marina Blvd | AWSC | 10.2 | B | 37.3 | E | | 7.2/6.8 | A/A |
| 11 | Doolittle Dr | Marina Blvd | Sig | 32.3 | C | 46.2 | D | | 45.2 | D |
| 12 | Merced St | Marina Blvd | Sig | 42.3 | D | 44.1 | D | | 44.1 | D |
| 13 | Kaiser Drwy | Marina Blvd | Sig | 14.0 | B | 14.1 | B | | 14.5 | B |
| 14 | I-880 Southbound ramps | Marina Blvd | Sig | 60.3 | E | 64.4 | E | 0.03 | 22.4 | C |
| 15 | I-880 Northbound ramps | Marina Blvd | Sig | 18.5 | B | 19.2 | B | | 19.2 | B |
| 22 | Aurora Dr | Fairway Dr | AWSC | 8.2 | A | 10.0 | B | | 10.0 | A |
| 23 | Doolittle Dr | Fairway Dr | Sig | 15.4 | B | 16.5 | B | | 16.5 | B |
| 24 | Merced St | Fairway Dr | Sig | 36.1 | D | 38.5 | D | | 38.5 | D |

Sig = Signalized

TWSC = Two-Way Stop Controlled

AWSC = All-Way Stop Controlled

LOS = Level of Service

Delay = Weighted average delay of all intersection approaches; the number in parentheses for two-way stop-controlled intersection indicates the average delay on the worst approach.

Change in V/C or delay is shown when relevant to significance determination

Bold font indicates substandard operations

Highlighted cell indicates significant impact

* The mitigated results of both roundabout/signalization are shown for the Aurora Road/Marina Boulevard intersection.

Source: Kittelson & Associates, 2014.

The addition of project traffic would exacerbate the substandard operations at these locations. However, it would only cause the v/c ratios to increase by 0.05 or more at two intersections. The v/c ratios would increase by 0.10 at the I-880 southbound ramps and Marina Boulevard intersection (#14) during the PM peak hour; while the service level would degrade from LOS D to LOS E in the AM peak hour. The v/c ratios at the San Leandro Boulevard and Marina Boulevard intersection (#18) would increase by 0.07 in the AM peak hour and 0.10 in the PM peak hour.

The project traffic would also cause the service levels to degrade to unacceptable levels at three signalized intersections where they would operate acceptably under Long-Term Cumulative No Project conditions. The Marina Boulevard intersections of Doolittle Drive (#11) would degrade to LOS F during the weekday analysis periods and Merced Street intersection (#12) would degrade from LOS D to LOS F during the AM and PM peak hours. The aforementioned intersection of Aladdin Avenue and Teagarden Street intersection (#27) would also degrade from LOS D to LOS E during the PM peak hour.

Unsignalized Intersections

Similar to the Near-Term Cumulative No Project scenario, all unsignalized intersections are projected to operate at acceptable levels under Long-Term Cumulative No Project scenario but the project

generated traffic would cause the same two all-way stop-controlled intersections to degrade to substandard levels. The Aurora Road and Marina Boulevard intersection (#10) would operate at LOS F during all three analysis periods and the Monarch Bay Drive and Mulford Point Drive intersection (#19) would degrade to LOS F during the PM peak hour with the addition of project traffic.

Long-Term Cumulative Intersection Impacts and Mitigation Measures

The Project's potential significant impacts were identified using the City's thresholds for intersections described in the Significance Criteria section. These impacts and mitigation measures to lessen any significant project impacts under Long-Term Cumulative Conditions are discussed below.

Signalized Intersections

Doolittle Drive and Marina Boulevard (#11). The addition of project traffic would cause the intersection level of service to degrade from LOS D to LOS F in the AM and PM peak hours. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #11: Implement Mitigation Measure #1 for the eastbound approach identified under the Baseline condition section would improve the operations to LOS D and lessen the cumulative impacts to **less than significant** during the AM and PM peak hours.

Merced Street and Marina Boulevard (#12). The addition of project traffic would cause the intersection level of service to degrade from LOS D to LOS E in the AM and PM peak hours. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #12: Implementation of the following measures would improve the operations to LOS D in both AM and PM peak hours and less the project impact to **less than significant**:

- Modify the traffic signal phasing and optimize cycle length and signal split times by improving operations of recently implemented adaptive traffic signals at this intersection.

I-880 southbound ramps and Marina Boulevard (#14). The addition of project traffic would cause the operations to degrade from LOS D to LOS E in the AM peak hour; and would exacerbate the substandard operations to further degrade the service levels from LOS E to LOS F in the PM peak hour and cause the v/c ratios to increase by 0.10, which is higher than the 0.05 allowed by the City. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #13: Implementation of Mitigation Measure #6 described under Near-Term Cumulative scenario by modifying the signal to a two-phase operation would improve the operations to LOS C in the AM peak hour and to LOS D in the PM peak hour and lessen the project impacts to less than significant. However, because this ramp intersection is under

Caltrans' jurisdiction, the implementation and timing of the mitigation measures are not under the City's control, therefore, the impact remains **significant and unavoidable**. Implementing adaptive traffic signals as identified in the Kaiser Permanente San Leandro Medical Center/Mixed-Use Retail Development Project EIR may also lessen the cumulative impacts. However, such implementation requires approval by Caltrans which has not yet been obtained.

San Leandro Boulevard and Marina Boulevard (#18). The addition of project traffic would exacerbate the substandard LOS F operations and cause the v/c ratio to increase by 0.07 in the AM peak hour and 0.10 in the PM peak hour. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #14: Implementation of the Mitigation Measure #7 would reduce the v/c ratios to less than significant level. However, as indicated, the available right-of-way would not be sufficient to accommodate the necessary northbound travel and bike lanes. Therefore, the measure is considered to be infeasible and the cumulative impact remain **significant and unavoidable**.

Aladdin Avenue and Teagarden Street (#27). The addition of project traffic would cause the level of service at this intersection to degrade from LOS D to LOS E in the PM peak hour. Therefore, the project impact is considered to be **significant**.

Mitigation Measure #15: Implementation of the following measure would improve the operations to LOS D in the PM peak hour and lessen the project impacts to **less than significant**:

- Optimize the traffic signal cycle length. This signal does not operate in coordination with any other signal.

Unsignalized Intersections

Aurora Road and Marina Boulevard (#10). The addition of project traffic would cause the level of service at this all-way stop controlled intersection to degrade from LOS A to LOS F in the AM peak hour and from LOS B to LOS F in the PM and Saturday peak hours. Therefore, the project impacts are considered to be **significant**.

Mitigation Measure #16: Implement Mitigation Measure #3 identified under the Baseline condition section by installing a mini-roundabout would improve the operations to LOS A in the AM and PM peak hours and to LOS B in the Saturday peak hour and lessen the cumulative impacts to **less than significant**.

Alternatively, installation of a traffic signal would also improve the operation to LOS B in the AM peak hour and LOS A in the PM and Saturday peak hours and lessen the cumulative impacts to **less than significant**.

Monarch Bay Drive and Mulford Point Drive (#19). The addition of project traffic would cause the level of service at this all-way stop controlled intersection to degrade from LOS A to LOS F in the PM peak hour. Therefore, the project impact is considered to be **significant**.

Mitigation Measure #17: Implement Mitigation Measure #4 identified under the Baseline condition section by installing a roundabout would improve the operations to LOS A in the PM peak hour and lessen the cumulative impacts to **less than significant**.

Long-Term Cumulative Freeway Operations

The weekday peak hour freeway operations are presented in Table 23 and the detailed calculation worksheets are provided in Appendix 6.

Table 23: Freeway Level of Service – Long Term Cumulative Conditions – AM & PM Peak Hour

| Location | Type | Long Term | | | Long Term + Project | | |
|--------------------------------|--------------------|---------------------|----------------------|------------------|---------------------|----------------------|------------------|
| | | Volume ¹ | Density ² | LOS ³ | Volume ¹ | Density ² | LOS ³ |
| AM Peak Hour | | | | | | | |
| I-880 Northbound | | | | | | | |
| Washington Av. to Marina Blvd. | Mainline | 8,172 | 29.1 | D | 8,323 | 29.8 | D |
| Marina Blvd. to Davis St. | Mainline | 8,538 | 37.8 | E | 8,547 | 37.9 | E |
| | Weave ⁴ | 1,707 | N/A | C | 1,715 | N/A | C |
| Davis St. to 98th Av. | Mainline | 6,389 | 28.2 | D | 6,442 | 28.5 | D |
| I-880 Southbound | | | | | | | |
| 98th Av. to Davis St | Mainline | 7,712 | 27.0 | D | 7,860 | 27.6 | D |
| Davis St. to Marina Blvd. | Mainline | 6,719 | 27.0 | C | 6,728 | 27.1 | C |
| | Weave ⁴ | 1,271 | N/A | B | 1,279 | N/A | B |
| Marina Blvd. to Washington Av. | Mainline | 8,339 | 29.9 | D | 8,403 | 30.2 | D |
| PM Peak Hour | | | | | | | |
| I-880 Northbound | | | | | | | |
| Washington Av. to Marina Blvd. | Mainline | 8,692 | 31.7 | D | 8,738 | 31.9 | D |
| Marina Blvd. to Davis St. | Mainline | 8,806 | 41.1 | E | 8,852 | 41.6 | E |
| | Weave ⁴ | 2,119 | N/A | C | 2,164 | N/A | C |
| Davis St. to 98th Av. | Mainline | 7,166 | 33.2 | D | 7,259 | 33.8 | D |
| I-880 Southbound | | | | | | | |
| 98th Av. to Davis St | Mainline | 7,063 | 24.3 | C | 7,141 | 24.6 | C |
| Davis St. to Marina Blvd. | Mainline | 9,317 | 41.6 | E | 9,363 | 42.1 | E |
| | Weave ⁴ | 1,686 | N/A | B | 1,731 | N/A | B |
| Marina Blvd. to Washington Av. | Mainline | 8,205 | 29.2 | D | 8,347 | 29.9 | D |

¹ Volume = vehicles per hour (vph)

² Density = passenger car per mile per lane (pc/m/ln)

³ LOS = Level of Service

⁴ Marina Blvd. to Davis St. analyzed as a weaving section using the Leisch Method as described in the Caltrans Design Manual, May 7, 2012. The volume shown for this segment is the weaving volume.

The same locations projected to operate unacceptably under Near Term Cumulative conditions would also experience substandard operations under Long Term Cumulative conditions. All three mainline segments: I-880 northbound between Marina Boulevard and Davis Street in the AM and PM peak hours and I-880 southbound between Davis Street and Marina Boulevard in the PM peak hour would operate at LOS E under Long Term Cumulative No Project scenario. The project would add traffic equivalent to 0.1 percent of the freeway's capacity to the northbound segment in the AM peak hour; and 0.5 percent to the same segment in the PM peak hour. It would also add 0.4 percent of the freeway's capacity to the southbound segment in the PM peak hour. Because the Project would not add traffic greater than one percent of the freeway segment's capacity, the project impacts are considered to be **less than significant**. All other study segments are projected to operate at LOS D or better.

CONGESTION MANAGEMENT PROGRAM

Congestion Management Program Land Use Analysis was performed to identify potential impacts of the Project on the Metropolitan Transportation System (MTS) roadway network and the MTS transit operators. The potential impacts of the Project to bicyclists and pedestrians are discussed under the later Pedestrian Impacts and Bicycle Impacts sections in this report. MTS roadways in the study area include Interstate 880, Doolittle Drive, and Davis Street.

Vehicle impacts were assessed at selected roadway locations include three segments of I-880 and two arterial segments on Doolittle Drive and on Davis Street. Transit impacts were addressed for AC Transit bus routes servicing the project study area (Line 89) and other nearby routes (Lines S and 75). The BART system was also investigated for the San Leandro BART station.

MTS Roadway Segments

Traffic forecasts for Year 2020 and Year 2035 conditions were extracted at the selected MTS roadway segments from the most current version of the Countywide Model, dated August 2011. The forecasts differ from those applied to the Circulation System Performance analysis in that no adjustments or changes were made to the Model in accordance to CMP guidelines. Consequently, the CMP analysis results do not account for land use developments or roadway improvements not already in the model. The Plus Project forecasts at the roadway segments were derived by manually adding the project-generated traffic developed for the Circulation System Performance analysis to the No Project forecasts.

Level of service analyses for selected MTS freeway and arterial segments were performed in accordance to methodologies discussed under the Analysis Methodologies and Level of Service Standards section. The LOS results along with peak hour volumes and density on the freeway analysis segments for Year 2020 and Year 2035 with and without Project conditions are provided in Table 24 and Table 25 and on the MTS arterial segments in Table 26 and Table 27.

Table 24 MTS Freeway LOS Results for 2020

| 2020 AM Peak Hour | | | | | | | | | |
|-----------------------------------|-------|---------------------|----------------------|------------------|---------------------|----------------------|------------------|---------------------|--------------|
| Location | Type | No Project | | | Plus Project | | | Change in V/C > 3%? | Significant? |
| | | Volume ¹ | Density ² | LOS ³ | Volume ¹ | Density ² | LOS ³ | | |
| I-880 Northbound | | | | | | | | | |
| I-880 - South of Marina Boulevard | Basic | 9,234 | 34.8 | D | 9,383 | 35.8 | E | No | No |
| I-880 - North of Marina Boulevard | Weave | 9,282 | V/C > 1 ⁴ | F | 9,288 | V/C > 1 ⁴ | F | No | No |
| I-880 - North of Davis Street | Basic | 8,862 | 50.3 | F | 8,908 | 51.0 | F | No | No |
| I-880 Southbound | | | | | | | | | |
| I-880 - North of Davis Street | Basic | 8,106 | 28.7 | D | 8,242 | 29.4 | D | No | No |
| I-880 - North of Marina Boulevard | Weave | 8,190 | 39.4 | E | 8,329 | 40.9 | E | No | No |
| I-880 - South of Marina Boulevard | Basic | 7,420 | 25.7 | C | 7,493 | 26.0 | D | No | No |
| 2020 PM Peak Hour | | | | | | | | | |
| Location | Type | No Project | | | Plus Project | | | Change in V/C > 3%? | Significant? |
| | | Volume ¹ | Density ² | LOS ³ | Volume ¹ | Density ² | LOS ³ | | |
| I-880 Northbound | | | | | | | | | |
| I-880 - South of Marina Boulevard | Basic | 8,716 | 31.8 | D | 8,777 | 32.1 | D | No | No |
| I-880 - North of Marina Boulevard | Weave | 8,968 | 46.2 | E | 9,005 | 46.7 | E | No | No |
| I-880 - North of Davis Street | Basic | 8,399 | 44.3 | E | 8,470 | 45.2 | F | No | Yes |
| I-880 Southbound | | | | | | | | | |
| I-880 - North of Davis Street | Basic | 9,488 | 36.5 | E | 9,551 | 36.9 | E | No | No |
| I-880 - North of Marina Boulevard | Weave | 9,630 | 49.9 | E | 9,665 | 50.4 | E | No | No |
| I-880 - South of Marina Boulevard | Basic | 9,528 | 36.7 | E | 9,673 | 37.7 | E | No | No |

Source: Kittelson & Associates, Inc., 2014.

¹ Volume = vehicles per hour (vph)

² Density = passenger car per mile per lane (pc/m/ln)

³ LOS = Level of Service

⁴ Volume Exceeds Weaving Segment Capacity

Bold font indicates exceedance of standard

Table 25 MTS Freeway LOS Results for 2035

| 2035 AM Peak Hour | | | | | | | | | |
|-----------------------------------|-------|---------------------|----------------------|------------------|---------------------|----------------------|------------------|---------------------|--------------|
| Location | Type | No Project | | | Plus Project | | | Change in V/C > 3%? | Significant? |
| | | Volume ¹ | Density ² | LOS ³ | Volume ¹ | Density ² | LOS ³ | | |
| I-880 Northbound | | | | | | | | | |
| I-880 - South of Marina Boulevard | Basic | 9,880 | 39.2 | E | 10,031 | 40.4 | E | No | No |
| I-880 - North of Marina Boulevard | Weave | 9,654 | V/C > 1 ⁴ | F | 9,662 | V/C > 1 ⁴ | F | No | No |
| I-880 - North of Davis Street | Basic | 9,598 | 63.2 | F | 9,651 | 64.3 | F | No | No |
| I-880 Southbound | | | | | | | | | |
| I-880 - North of Davis Street | Basic | 9,019 | 33.5 | D | 9,167 | 34.4 | D | No | No |
| I-880 - North of Marina Boulevard | Weave | 9,338 | 48.1 | E | 9,477 | 49.9 | E | No | No |
| I-880 - South of Marina Boulevard | Basic | 8,755 | 32.0 | D | 8,819 | 32.4 | D | No | No |
| 2035 PM Peak Hour | | | | | | | | | |
| Location | Type | No Project | | | Plus Project | | | Change in V/C > 3%? | Significant? |
| | | Volume ¹ | Density ² | LOS ³ | Volume ¹ | Density ² | LOS ³ | | |
| I-880 Northbound | | | | | | | | | |
| I-880 - South of Marina Boulevard | Basic | 9,764 | 38.4 | E | 9,810 | 38.7 | E | No | No |
| I-880 - North of Marina Boulevard | Weave | 9,860 | V/C > 1 ⁴ | F | 9,905 | V/C > 1 ⁴ | F | No | No |
| I-880 - North of Davis Street | Basic | 9,889 | 70.0 | F | 9,982 | 72.6 | F | No | No |
| I-880 Southbound | | | | | | | | | |
| I-880 - North of Davis Street | Basic | 10,199 | 41.8 | E | 10,277 | 42.4 | E | No | No |
| I-880 - North of Marina Boulevard | Weave | 10,276 | V/C > 1 ⁴ | F | 10,346 | V/C > 1 ⁴ | F | No | No |
| I-880 - South of Marina Boulevard | Basic | 10,121 | 41.1 | E | 10,263 | 42.3 | E | No | No |

Source: Kittelson & Associates, Inc., 2014.

¹ Volume = vehicles per hour (vph)

² Density = passenger car per mile per lane (pc/m/ln)

³ LOS = Level of Service

⁴ Volume Exceeds Weaving Segment Capacity

Bold font indicates exceedance of standard

Table 26 MTS Arterial LOS Results for 2020

| Segment | Northbound/ Eastbound | | | | | | | |
|---------------------------------------|------------------------|--------------------------|---------------------|------------------|---------------------|-----------------------|-----------------------|---------------------|
| | 2020 No-Project Volume | 2020 Plus Project Volume | Change in V/C Ratio | Change in Volume | 2020 No-Project LOS | 2020 Plus Project LOS | Change in V/C > 0.03? | Significant Impact? |
| AM Peak Hour | | | | | | | | |
| Doolittle Drive North of Davis Street | 2,282 | 2,325 | 0.02 | 43 (1.9%) | F | F | No | No |
| Davis Street East of Doolittle Drive | 810 | 853 | 0.03 | 43 (5.3%) | C | C | No | No |
| PM Peak Hour | | | | | | | | |
| Doolittle Drive North of Davis Street | 2,126 | 2,230 | 0.06 | 104 (4.9%) | F | F | Yes | Yes |
| Davis Street East of Doolittle Drive | 1,930 | 1,973 | 0.03 | 43 (2.2%) | F | F | No | No |
| Segment | Southbound/ Westbound | | | | | | | |
| | 2020 No-Project Volume | 2020 Plus Project Volume | Change in V/C Ratio | Change in Volume | 2020 No-Project LOS | 2020 Plus Project LOS | Change in V/C > 0.03? | Significant Impact? |
| AM Peak Hour | | | | | | | | |
| Doolittle Drive North of Davis Street | 722 | 792 | 0.04 | 70 (9.7%) | C | C | Yes | No |
| Davis Street East of Doolittle Drive | 1,975 | 1,978 | 0.00 | 3 (0.2%) | F | F | No | No |
| PM Peak Hour | | | | | | | | |
| Doolittle Drive North of Davis Street | 2,152 | 2,213 | 0.03 | 61 (2.8%) | F | F | No | No |
| Davis Street East of Doolittle Drive | 1,754 | 1,787 | 0.02 | 33 (1.9%) | F | F | No | No |

Volume Source: Alameda CTC Countywide Model

Kittelson & Associates, Inc. 2014

Bold font indicates exceedance of standard

Shaded cell indicates significant impact

Table 27 MTS Arterial LOS Results for 2035

| Segment | Northbound/ Eastbound | | | | | | | |
|---------------------------------------|------------------------|--------------------------|---------------------|------------------|---------------------|-----------------------|-----------------------|---------------------|
| | 2035 No-Project Volume | 2035 Plus Project Volume | Change in V/C Ratio | Change in Volume | 2035 No-Project LOS | 2035 Plus Project LOS | Change in V/C > 0.03? | Significant Impact? |
| AM Peak Hour | | | | | | | | |
| Doolittle Drive North of Davis Street | 2,828 | 2,866 | 0.02 | 38 (1.3%) | F | F | No | No |
| Davis Street East of Doolittle Drive | 1,085 | 1,134 | 0.03 | 49 (4.5%) | D | D | No | No |
| PM Peak Hour | | | | | | | | |
| Doolittle Drive North of Davis Street | 2,310 | 2,381 | 0.04 | 71 (3.1%) | F | F | Yes | Yes |
| Davis Street East of Doolittle Drive | 2,015 | 2,073 | 0.03 | 58 (2.9%) | F | F | No | No |
| Segment | Southbound/ Westbound | | | | | | | |
| | 2035 No-Project Volume | 2035 Plus Project Volume | Change in V/C Ratio | Change in Volume | 2035 No-Project LOS | 2035 Plus Project LOS | Change in V/C > 0.03? | Significant Impact? |
| AM Peak Hour | | | | | | | | |
| Doolittle Drive North of Davis Street | 963 | 1,017 | 0.03 | 54 (5.6%) | C | C | No | No |
| Davis Street East of Doolittle Drive | 1,974 | 1,989 | 0.01 | 15 (0.8%) | F | F | No | No |
| PM Peak Hour | | | | | | | | |
| Doolittle Drive North of Davis Street | 2,552 | 2,595 | 0.02 | 43 (1.7%) | F | F | No | No |
| Davis Street East of Doolittle Drive | 1,999 | 2,014 | 0.01 | 15 (0.8%) | F | F | No | No |

Volume Source: Alameda CTC Countywide Model

Kittelson & Associates, Inc. 2014

Bold font indicates exceedance of standard

Shaded cell indicates significant impact

MTS Freeway Segments

The Year 2020 results indicate that the I-880 northbound segments north of Marina Boulevard and north of Davis Street would be at LOS F before the addition of project traffic in the AM peak hour. However, the Project would not cause the V/C ratios to increase by more than 0.03. In the PM peak hour, the northbound segment north of Davis Street would degrade from LOS E to LOS F when traffic was added.

Under Year 2035 conditions, the two I-880 northbound segments north of Marina Boulevard and north of Davis Street were projected to be at LOS F before the addition of project traffic in both the AM and PM peak hours. However, the Project would not cause the V/C ratios to increase by more than 0.03. Similarly, the southbound segment north of Marina Boulevard would also operate at LOS F without the Project. While the Project would add traffic to this segment, the V/C ratio would not increase by more than 0.03.

MTS Arterial Segments

The MTS arterial segment analysis results are similar for both Year 2020 and Year 2035 with the same segments projected at LOS F with and without the addition of project traffic. The northbound Doolittle Drive segment north of Davis Street would be at LOS F before the addition of project traffic in both AM and PM peak hours. The Project would cause the V/C ratios to increase by more than 0.03 in only the PM peak hour. The southbound Doolittle Drive segment north of Davis Street would also be at LOS F in the PM peak hour; but the increase in V/C ratio resulting from the Project traffic is less than 0.03.

The Davis Street segment east of Doolittle Street would operate at LOS F in both the eastbound and westbound directions in the PM peak hour, and in the westbound direction in the AM peak hour under both Year 2020 and Year 2035 conditions. However, the Project would not cause the V/C ratios to increase by more than 0.03 in neither peak periods.

MTS Roadway Segment Impacts and Mitigation Measures

The Project's potential significant impacts were identified using the City's thresholds for MTS roadway segments described in the Significance Criteria section. These impacts and mitigation measures to lessen any significant project impacts are discussed below. **I-880 northbound segment north of Davis Street.** The addition of project traffic would cause the freeway segment to deteriorate from LOS E to LOS F in the PM peak hour by exceeding the LOS E threshold by 0.02 under Year 2020 conditions. Therefore, the Project impact is considered to be **significant**.

Mitigation Measure #18: Widening I-880 to provide an additional travel lane in the northbound direction would fully mitigate the Project impact. However, this measure is not considered to be feasible due to cost and right of way constraints.

Alternatively, developing and implementing a transportation demand management (TDM) plan to include measures such as provision of a shuttle service that operates between the Project site and key locations such as San Leandro and Coliseum BART stations and Oakland International Airport during the PM peak hour would likely lessen the Project's impact on the freeway segment. However, the effectiveness of the shuttle service or other TDM measures in reducing the number of Project trips cannot be adequately quantified. The on-going I-880 Integrated Corridor Management effort led by the Metropolitan Transportation Commission that aims to optimize freeway, arterial signal, rail, and bus systems and incorporate Intelligent Transportation System would also help enhance efficiency on the freeway. However, the Project impact would remain **significant and unavoidable**.

Doolittle Drive northbound segment north of Davis Street. The Project would cause the V/C ratio on the northbound segment of Doolittle Drive, which would operate at LOS F, to increase by 0.06 under Year 2020 conditions and by 0.04 under Year 2035 conditions in the PM peak hour. Therefore, the Project impacts are considered to be **significant**.

Mitigation Measure #19: Widening Doolittle Drive to provide an additional travel lane in the northbound direction would improve to LOS C in Year 2020 and LOS D in Year 2035 and would fully mitigate the Project impact. However, the feasibility of this measure is uncertain due to right of way constraints along this mostly developed corridor. Alternatively, provision of a shuttle service that operates between the Project site and key locations such as San Leandro and Coliseum BART stations and Oakland International Airport during the PM peak hour would likely lessen the Project's impact on the freeway segment. However, the effectiveness of the shuttle service in reducing the number of Project trips on Doolittle Drive cannot be adequately quantified. The on-going I-880 Integrated Corridor Management effort led by the Metropolitan Transportation Commission that aims to optimize freeway, arterial signal, rail, and bus systems and incorporate Intelligent Transportation System would also help enhance efficiency on the freeway. However, the Project impact would remain **significant and unavoidable**.

MTS Transit Operations

The two primary transit agencies serving the Project area are AC Transit and BART. AC Transit lines S, 75, and 89 provide bus service in the study area; while the San Leandro BART station is the closest to the Project site. AC Transit line 89 provides direct access to the project site connecting it to the San Leandro BART station. According to the BATS2000 mode shares by trip purpose and proximity to rail and ferries table,⁸ the Project is expected to generate a 2.7 percent rail and ferry mode share and a 2.4 percent bus mode share. The associated number of trips are detailed in Table 28.

⁸ Alameda County Transportation Commission, Congestion Management Program, October 2013. Appendix L.

Table 28 Mode Split for Total Trips Generated by a Project more than 1 Mile from a BART Station with a High Suburban Density

| Mode | Percentage | Weekday | AM Peak Hour | | | PM Peak Hour | | | Saturday | | |
|-------------------|------------|---------|--------------|-----|-------|--------------|-----|-------|----------|-----|-------|
| | | | In | Out | Total | In | Out | Total | In | Out | Total |
| In-Vehicle Person | 82.0% | 7,177 | 570 | 284 | 853 | 339 | 531 | 869 | 427 | 279 | 705 |
| Rail & Ferry | 2.7% | 236 | 19 | 9 | 28 | 11 | 17 | 29 | 14 | 9 | 23 |
| Bus | 2.4% | 210 | 17 | 8 | 25 | 10 | 16 | 25 | 13 | 8 | 21 |
| Bicycle | 1.1% | 96 | 8 | 4 | 11 | 5 | 7 | 12 | 6 | 4 | 9 |
| Pedestrian | 10.7% | 936 | 74 | 37 | 111 | 44 | 69 | 113 | 56 | 36 | 92 |
| Other | 1.2% | 105 | 8 | 4 | 12 | 5 | 8 | 13 | 6 | 4 | 10 |

Source: Kittelson & Associates, 2014.

Effects of Vehicle Traffic on Mixed Flow Transit Operations

An assessment was made to determine if vehicle trips generated by the Project will cause congestion that degrades transit vehicle operations. AC Transit currently operates three lines in the area which include S, 75, and 89. The S line is a transbay service providing service between Eden Shores Park in Hayward and the Transbay Terminal in San Francisco. Both lines 75 and 89 provide circulator routes that stop at both the San Leandro and Bay Fair BART stations.

AC Transit Line S departs Interstate 880 at the Marina Boulevard interchange and proceeds down Merced Street. The Project is not expected to significantly increase the number of vehicles or delay on Merced Street. However, the Project would affect transit operations on this line near the I-880 Marina interchange due to the increase in vehicle volume resulting from the Project. The increased number of vehicles would cause an increase in delay for transit vehicles. The proposed mitigation measure for the Marina Boulevard and I-880 southbound off ramp (#14) identified under both Near-Term Cumulative and Long-Term Cumulative sections in the Circulation System Performance analysis would eliminate this delay resulting in little or no impact on Line S.

Line 75 runs a similar route as Line S near the project site using Merced Street to proceed south. Merced Street itself is not expected to impact transit operations as a result of the Project but this line runs though the Marina Boulevard and Merced Street intersection (#12). Project traffic using Marina Boulevard may increase the delay of Line 75 at this intersection. However, the increase in delay is expected to be minimal and the proposed mitigation measure for this intersection as described under the Long-Term Cumulative section in the Circulation System Performance analysis would lessen any impact to Line 75's operations to less than significant level.

Of the three transit lines near the proposed Project, Line 89 is expected to be most affected by the proposed Project. Line 89 uses Davis Street and Williams Street when heading towards and away from the San Leandro BART station. While these two facilities are not expected to be greatly affected by the

Project, Line 89 uses the Marina Boulevard and Aurora Street intersection as well as routing along Monarch Bay Drive. Most of the project trips would pass through one or both of these two intersections; thereby would potentially impact the transit operations of Line 89. However, proposed mitigations to install roundabouts or traffic signals as discussed in the Circulation System Performance analysis at the Monarch Bay Drive and Mulford Point Drive intersection (#19) and at the Aurora Road and Marina Boulevard intersection (#10) would be sufficient to mitigate any impacts to the transit operations.

Transit Operations. The Project would cause increase in delays at the Aurora Road and Marina Boulevard (#10), Marina Boulevard and Merced Street (#12), Marina Boulevard and I-880 southbound off ramp (#14), and Monarch Bay Drive and Mulford Point Drive (#19) intersections, which would adversely impact the transit operations of AC Transit Line S, 75 and 89.

Mitigation Measure #20: Implementation of mitigation measures identified in the Circulation System Performance analysis would fully mitigate the Project impact by improving transit travel time through intersections impacted by the Project . Design of any roundabouts should accommodate AC Transit busses. Upon implementation, the Project impacts are **less than significant**.

Transit Capacity

In addition to the vehicle impact on transit operations, the CMP guidelines require a determination for whether a proposed Project would cause the existing transit service to exceed its available capacity. Both BART and the three AC Transit lines were considered.

The San Leandro BART station is located approximately three miles north east of the Project site. As shown in Table 28 and Table 29, the Project is expected to generate 236 weekday BART trips with 28 occurring in the AM peak hour and 29 in the PM peak hour. The project is also expected to generate 23 trips during the Saturday peak hour. Table 29 shows the distribution of project trips for each peak hour on BART. The Project is likely to contribute between 2 and 5 additional passengers per train which will not result in exceedance of BART's capacity.

Table 29 BART Peak Hour Project Trips

| Peak Hour | Project Trips | BART Trains | Additional Passengers/Train |
|-----------|---------------|-------------|-----------------------------|
| AM | 28 | 12 | 2.3 |
| PM | 29 | 12 | 2.4 |
| SAT | 23 | 6 | 3.8 |

Source: Kittelson & Associates, 2014.

The Project is estimated to generate 210 bus trips per day with approximately 25 occurring in the AM and PM peak hours with 21 during the Saturday peak hour. Line 75 currently operates one bus per hour while Lines S and 89 operate two busses per hour during the weekday peak hour. Line 89 is the only line operating on Saturday on a one bus per hour frequency.

Lines S and Line 75 do not provide direct access to the project site and would therefore not be expected to carry the full number of peak hour trips generated by the Project. Currently, the average maximum load factor of Line S is 0.41 for the AM commute meaning only 41 percent of seats are filled in the busiest section on average. The average maximum load factor of Line 75 is 0.38. The capacity of these two lines is therefore not expected to be exceeded by the proposed Project, which would generate up to 25 transit trips in the peak hour and is not directly served by these two routes.

Line 89 serves the project site directly and would likely be used by all 25 of the peak hour transit bus riders. The average maximum load factor for any one segment of Line 89 is approximately 0.40. This route currently uses a 25-passenger bus which leaves 15 available seats at the average maximum load factor on this route. If all 25 transit passengers from the Project all board the same bus, there would not be sufficient seats to accommodate all riders leaving 10 riders standing on average in the most crowded section of the route. However, this is a local bus line and is therefore meant for short duration trips. Standing passengers over short distances would not significantly impact the capacity of Line 89.

Based on the above assessment, the Project would not cause the transit ridership to exceed existing transit capacity. Therefore, the Project impact is **less than significant**.

Transit Access and Egress

The conceptual drawing of the Project indicates adequate connections between local transit service and the Project site. It is assumed that sidewalks would be built to the current ADA accessibility guidelines including both clear width and appropriate curb ramp design in accordance to City standards. The Project includes a promenade that surrounds the site and connects across the existing marina entrance via a new pedestrian and bicycle bridge. The promenade would facilitate transit riders from the marina side of the Project site to the bus stops on Monarch Bay Drive and Fairway Drive. Project residents on the east side of Monarch Bay Drive are provided with walkways that lead to the bus stops.

Based on the above assessment, the Project would provide adequate pedestrian connection between the Project site and transit stops. Therefore, the Project impact is **less than significant**.

Future Transit Service

The Project site is currently served by AC Transit Line 89 which runs along Monarch Bay Drive. Project improvements along this route would not preclude future transit service. Additionally, a shuttle service is being recommended as a mitigation measure for the Project. A shared shuttle service with the new Kaiser Medical Center would be considered.

Consistency with Adopted Plans

The Project's consistency with transit operator's adopted plans was considered. The Project is not expected to generate significant BART trips that would exceed the current capacity of the BART trains. Its implementation would also not affect any future plans established by BART. AC Transit's future plans are also not expected to be inhibited by the proposed Project.

DESIGN AND INCOMPATIBLE USE HAZARDS

The conceptual master plan drawing contained in the Notice of Preparation dated December 11, 2013 was reviewed to assess any potential hazards due to Project design and incompatible use. The proposed land uses are generally compatible with existing uses in the project area and would not result in undue hazards. Therefore, this assessment focuses on potential hazards due to design. Because the drawing lacks sufficient details, this assessment is limited to a high level basis. A more thorough review should be performed during the entitlement process to ensure that all proposed designs comply with City standards.

The drawing shows three access driveways for the 64-unit North Golf Course residential on the east side of Monarch Bay Drive. The northern driveway is located near the transition between Monarch Bay Drive and Marina Boulevard. It is slightly off-set to the east from Neptune Drive and would provide right-turn inbound and right-turn outbound movements to and from the driveway. Southbound through vehicles from Neptune Drive may also access this driveway; whereas all other movements would be restricted by physical barriers. The segment of Monarch Bay Drive immediate to the west of the driveway is a curvilinear road. The curvy road presents a potential sight distance challenge for outbound motorists at the driveway. The motorists would experience difficulty seeing oncoming vehicles traveling in the northeasterly direction on Monarch Bay Drive before they get too close to the driveway and would not have sufficient time to make the right-turn exit.

The proposed southern driveway of the North Golf Course residential is located on Monarch Bay Drive just south of the relocated Mulford Point Drive intersection. As a generally rule, it is always preferable to provide a uniform four-legged intersection rather than an off-set leg. It is particularly important in this situation to shift the driveway to the north because the currently proposed driveway would enter onto Monarch Bay Drive where the stop bar for northbound vehicles would be located. If the mitigation measure for the Monarch Bay Drive and Mulford Point Drive intersection (#19) discussed under the Circulation System Performance section is implementation, a roundabout would operate more effectively with a standard fourth leg and would be able to accommodate the added driveway volumes.

North Golf Course Residential Northern Driveway. The location of the proposed northern driveway would potentially result in design hazard due to sight distance concerns. The Project impact is considered to be **significant**.

Mitigation Measure #21: As the 64-unit development would be served by two other access driveways, this northern driveway shall be removed from the Project plan. The small amount of

diverted traffic could be accommodated by the remainder two driveways without resulting in secondary impact. Upon implementation, the Project impact is **less than significant**.

North Golf Course Residential Southern Driveway. The proposed southern driveway would potentially result in design hazard due to its location in relation to the proposed Monarch Bay Drive and Mulford Point Drive intersection. The Project impact is considered to be **significant**.

Mitigation Measure #22: The Project shall move the driveway to the north to form a standard four-legged intersection. Upon implementation, the Project impact is **less than significant**.

EMERGENCY ACCESS

The proposed concept design is required to comply with all City roadway and access standards as well as other requirements in the California Fire Code and California Vehicle Code. The Project is well-served by public streets and based on the concept plan, the proposed Project would not result in inadequate emergency access and a *less-than-significant* impact would result.

BICYCLE IMPACTS

An assessment was made to determine the Project's potential impacts on bicyclists and bicycle facilities. The City of San Leandro Bicycle and Pedestrian Master Plan and the Alameda Countywide Bicycle Plan⁹ both include a planned Class II bicycle lane along Monarch Bay Drive between Neptune Drive and Fairway Drive and a planned Class I bicycle path in the marina area of the Project site. These bicycle facilities would fill the bicycle facility gap along this portion of the San Francisco Bay Trail. The proposed public promenade along the waterfront edge would provide the Class I facility identified in the plans. The Project would also install Class II bicycle lane along Monarch Bay Drive.

Vehicle trips generated by the Project are expected to be greater than 850 trips in the AM and PM peak hours with most of this traffic using Marina Boulevard to access San Leandro and other destinations. This volume increase is likely to make Marina Boulevard a less desirable route for bicyclists. The existing bike lanes on Williams Street and planned bike lanes/routes on Davis Street would provide the primary east/west connections to the Project site via the planned bike lanes on Doolittle Drive and the existing bike route on Neptune Drive. Most of the Project traffic is funneled through the intersection of Monarch Bay Drive and Mulford Point Drive. As such, the Project would not present significant barriers to bicyclists by limiting driveways along the main access road.

With the construction of a Class II bicycle lane along Monarch Bay Drive, the Project would have less than significant impact on bicyclists.

⁹ Alameda County Transportation Commission, Alameda Countywide Bicycle Plan, adopted October 25, 2012.

PEDESTRIAN IMPACTS

An assessment was made to determine the Project's potential impacts on pedestrians and pedestrian facilities. The 20-foot wide promenade along the waterfront edge would provide protected walkways for pedestrians in the marina area. The promenade would be connected to the west side of Monarch Bay Drive at the existing path just south of Neptune Drive and continue south to the Mulford Point Drive intersection. A similar multi-use path is also proposed on the east side of Monarch Bay Drive from the northern driveway to the southern driveway of the North Golf Course Residential.

The Project portion of Monarch Bay Drive between Marina Boulevard and Fairway Drive is contained within the San Leandro Marina Pedestrian Improvement Area identified in the City's Bicycle and Pedestrian Master Plan for targeted pedestrian improvements. Specifically, the plan stated that "continuous pedestrian pathways should be created on both sides of Monarch Bay Drive...to facilitate a safe pedestrian environment to this major destination." The plan further requires that "crosswalks, a minimum of 250 to 350 feet apart, should be installed along Monarch Bay Drive to encourage pedestrians to cross at safe locations." The plan specifically indicated that a pedestrian crossing should be created at the Monarch Bay Drive and Neptune Drive intersection. The Project would accommodate these requirements by installing marked crosswalks and a pedestrian path along its frontage of Monarch Bay Drive.

Since Monarch Bay Drive is a curvilinear road, a sight distance analysis was performed in considering the placements of marked crosswalks at Neptune Drive and at the middle driveway of the North Golf Course Residential/Parking Structure Access which is located approximately where the existing Mulford Point Drive intersects Monarch Bay Drive. These two locations are logical placement of marked crosswalks for the Project. Bus stops are located on both sides of Monarch Bay Drive at Neptune Drive, which provide the nearest transit stops for residents and visitors of the Project's North Golf Residential and North Residential. The second location provides direct connection between the main driveway of the North Golf Residential and the office parking structure, and potentially the most direct access to the promenade.

The estimated radius for the horizontal curve on Monarch Bay Drive between Mulford Point Drive and Neptune Drive is approximately 500 feet. A 500-foot curve radius provides a design speed of 35 mph provided no obstruction is present to impede sight distance. Assuming a pedestrian is standing at the edge of a 12-foot travel lane, a northbound driver traveling at 25 mph would need approximately 150 feet to see the pedestrian and come to a complete stop. At the current speed limit of 30 mph on Monarch Bay Drive, the driver would need almost 200 feet to see the pedestrian. However, for vehicles heading northbound to Neptune Drive and southbound to the North Golf Course Residential driveway, pedestrians are visible from approximately 155 feet due to the curvature of the roadway.

Reducing the speed limit on Monarch Bay Drive from 30 mph to 25 mph may allow more time for the vehicles to stop for pedestrians if marked crosswalks are to be installed. However, speed limit reduction may conflict with the California Vehicle Code regarding how speed limits are to be determined. The City should a conduct speed survey upon completion of the Shoreline Development Project in order to

determine the appropriate speed limit on Monarch Bay Drive with the new developments along the roadway.

Because the travel lane is much wider than 12 feet, bulb-outs should be installed at both locations to increase visibility of the pedestrians before they step onto the travel lane. Bulb-outs would also shorten pedestrian crossing distance thereby limiting their exposure to moving vehicles and create a traffic calming effect for vehicles.

The following features may also be considered:

- Prohibit on-street parking in advance of the crosswalks to provide adequate visibility if bulb outs are not installed;
- Install high visibility crosswalks
- Provide pedestrian crossing sign assembly (W11-2 with W16-7P) and advance warning sign assembly (W11-2 with W16-9P)
- Install a curve warning sign (W1-2) and an advisory speed plaque (W13-1P) at each advance warning location as well as a combination curve/advisory speed sign (W1-2a) to encourage motorists to reduce speed
- Install rectangular rapid flashing beacons (RRFB) on both the existing median and the curb

CONSTRUCTION-RELATED DISCUSSION

The Project would be constructed over a multi-year period. Construction would include numerous disruptions to the transportation system in and around the Project area, including temporary street closures and sidewalk closures. Heavy vehicles would access the Project area and would need to be staged for construction. Short-term construction activities and staging of construction vehicles and equipment would result in degraded roadway operations. Project construction activities including the import of the clean fill material could affect vehicle and pedestrian access in and around the Project area.

Before issuance of grading permits for the Project site, the Project applicant shall prepare a detailed Traffic Management Plan that will be subject to review and approval by the City's Engineering & Transportation Department, Police Department and Fire Department; as well as AC Transit and Caltrans. The plan shall ensure maintenance of acceptable operating conditions on local roadways and transit routes. At a minimum, the plan shall include:

- The number of truck trips, time, and day of street closures
- Time of day of arrival and departure of trucks
- Limitations on the size and type of trucks; provision of a staging area with a limitation on the number of trucks that can be waiting
- Provision of a truck circulation pattern
- Provision of a driveway access plan to maintain safe vehicular, pedestrian, and bicycle movements (e.g., steel plates, minimum distances of open trenches, and private vehicle pick up and drop off areas)
- Safe and efficient access routes for emergency vehicles
- Efficient and convenient transit routes
- Manual traffic control when necessary
- Proper advance warning and posted signage concerning street closures
- Provisions for pedestrian safety
- Provisions for temporary bus stops and detours, if necessary

PARKING DISCUSSION

The Project proposed to provide 2,057 on-site parking spaces to be located in a parking structure, within residential areas, and in open lots throughout the Project site. This parking analysis assessed the adequacy of the proposed number of spaces based on the City's zoning code requirements as well as parking demand estimation according to *Parking Generation* (4th edition) published by the Institute of Transportation Engineers (ITE). Due to the mixed-use nature of the proposed Project, there are ample opportunities for shared parking as well as internal trip making that would likely be conducted on foot rather than by vehicles. Such opportunities are not taken in to account in neither the number of spaces required by the City's code nor the estimated parking demand.

PARKING REQUIREMENTS

A comparison of the proposed parking supply and the City's requirement is shown in Table 30. The use classification of the City's Zoning Code Section 4-1704 does not include or correlate directly with some of the proposed uses. Therefore, a number of assumptions were made in determining the City's off-street parking requirement shown in the table. The parking requirement for banquet facility within a hotel was applied for the proposed conference center. This application is appropriate because hotel banquet facilities and conference center serve many similar functions. Both are used to host social events, such as weddings and reunions, or hold educational seminars or classes. They could be rented for corporate events or trade shows or any number of activities. The parking requirement for cultural institution, which encompasses such uses as library, was applied for the public library use. For the café and boat rental use located in the South Mixed Use area, this analysis assumed the café would occupy 50 percent of the 8,000 square feet of space and the boat rental would occupy the other 50 percent. The City's parking requirement for marine sales was applied to the boat rental use. Lastly, the Code does not include use classification for park or open space. Per consultation with the City, the requirement in the table reflects the parking demand for City Park shown in the ITE manual.

Based on the above discussion, the City requires a total of 2,140 off-street parking spaces. As the Project proposed to supply only 2,057 spaces, the Project does not comply with City requirement with total deficit of 83 spaces. The differences in parking space provision vary among the different uses and different areas of the Project. The proposed number of spaces meets the Code requirements for the office and hotel land uses as well as for the residential uses in the North Residential and North Golf Course areas. They exceed the required spaces by 87 in the South Golf Course residential area and by 72 for the public library. The 159 space surplus could not make up the deficit for conference center (-100 spaces) and restaurants (-90 spaces total) uses, and the 12 space deficit in the South Mixed Use area, which can largely be attributed to the café/boat rental land use. Furthermore, the Project did not provide any parking for visitors to the parks and open space (-40 spaces).

Table 30 Off-Street Parking– City Zoning Code Requirements

| Land Use | Quantity | | Code Requirement | Required # of Spaces | Proposed # of Spaces | Difference |
|--------------------------------|----------|-------|---|----------------------|----------------------|------------|
| | | | | | | |
| Office | 150 | ksf | 1 space/300 sqft | 500 | 500 | 0 |
| Conference Center ¹ | 15 | ksf | 1 space /50 sqft | 300 | 200 | -100 |
| Restaurant | 5 | ksf | 1 space/100 sqft for first 4ksf; then 1/50 sqft | 60 | 30 | -30 |
| Hotel | 200 | rooms | 1.1 space/room | 220 | 220 | 0 |
| Banquet Facility | 5 | ksf | 1 space /50 sqft | 100 | 100 | 0 |
| Restaurant | 8 | ksf | 1 space/100 sqft for first 4ksf; then 1/50 sqft | 120 | 60 | -60 |
| Park/Open Space ² | 14.48 | acres | 2.8 spaces/acre | 40 | 0 | -40 |
| Public Library ³ | 2.5 | ksf | 1 space/300 sqft | 8 | 80 | 72 |
| North Residential | | | | | 308 | 0 |
| Studio/1-bedroom multifamily | 66 | units | 1.5 spaces/unit | 99 | | |
| 2-bedroom multifamily | 93 | units | 2.25 spaces/unit | 209 | | |
| South Mixed Use | | | | | 158 | -12 |
| Café/Boat Rental ⁴ | 8 | ksf | 1 space /350 sqft for Boat Rental & 1 space/100 sqft for Cafe | 51 | | |
| Studio/1-bedroom condo | 25 | units | 1.5 spaces/unit | 38 | | |
| 2-bedroom condo | 36 | units | 2.25 spaces/unit | 81 | | |
| North Golf Course | | | | | 160 | 0 |
| 3+-bedroom townhome | 64 | units | 2.5 spaces/unit | 160 | | |
| South Golf Course | | | | | 241 | 87 |
| 3-bedroom unit townhome | 28 | units | 2.5 spaces/unit | 70 | | |
| Single-Family Home | 42 | units | 2 spaces/unit | 84 | | |
| Total | | | | 2,140 | 2,057 | -83 |

¹ Hotel Banquet Facility requirement is applied for the Conference Center land use

² Parking requirement for Park and Open Space is derived from the parking demand ratio (2.8 per acre) for City Park from Parking Generation, 4th edition (ITE)

³ Cultural Institution requirement is applied for the Public Library land use

⁴ It is assumed that the café and boat rental uses would occupy the same amount of area (4,000 sqft each). Marine Sales requirement is applied for the Boat Rental land use

PARKING DEMAND

A comparison of the proposed parking supply and the Projected parking demand is shown in Table 31. The parking demand was calculated using the average peak period parking demand data from the ITE manual for each of the land use categories. In calculating the parking demand, the same assumption was made regarding the square footage of the café and boat rental land uses. Because ITE does not contain any data for boat rental or similar use, the City's code requirement for Marine Sale was applied.

Further, ITE's convention center category was applied to the conference center land use. Whenever different data are presented for suburban and urban locations in the ITE manual, data for suburban locations were used. It is noted that ITE's parking demand information was based on data available from survey sites. These data are sometimes limited to those collected at only a handful of sites with the exception of the most common categories such as residential, office, and shopping center.

Table 31 Off-Street Parking – Estimated Parking Demand

| Land Use | Quantity | | Average Peak Period Demand | Demand | Proposed # of Spaces | Difference |
|--|----------|-------|---|--------------|----------------------|------------|
| Office (ITE 701) | 150 | ksf | 2.84/ksf | 426 | 500 | 74 |
| Conference Center (ITE 595) - weekday ¹ | 15 | ksf | 0.31/attendee | 233 | 200 | -33 |
| Restaurant (ITE 931) - weekend | 5 | ksf | 16.4/ksf | 82 | 30 | -52 |
| Hotel (310) - weekday | 200 | rooms | 0.89/occupied room | 178 | 220 | 42 |
| Banquet Facility | 5 | ksf | included in Hotel | 0 | 100 | 100 |
| Restaurant (ITE 931) - weekend | 8 | ksf | 16.4/ksf | 131 | 60 | -71 |
| Park/Open Space (ITE 411) | 14.48 | acres | 2.8 spaces/acre | 40 | 0 | -40 |
| Public Library (ITE 590) | 2.5 | ksf | 2.61/ksf | 7 | 80 | 73 |
| North Residential (ITE 221) | | | | | 308 | 112 |
| Studio/1-bedroom apartment | 66 | units | 1.23 spaces/unit | 81 | | |
| 2-bedroom apartment | 93 | units | 1.23 spaces/unit | 114 | | |
| South Mixed Use | | | | | 158 | 8 |
| Café/Boat Rental ² | 8 | ksf | 13.56/ksf for café; 1/350 sqft for boat rental | 66 | | |
| Studio/1-bedroom condo (ITE 230) | 25 | units | 1.38 spaces/unit | 35 | | |
| 2-bedroom condo (ITE 230) | 36 | units | 1.38 spaces/unit | 50 | | |
| North Golf Course (ITE 230) | | | | | 160 | 72 |
| 3+-bedroom townhome | 64 | units | 1.38 spaces/unit | 88 | | |
| South Golf Course | | | | | 241 | 126 |
| 3-bedroom unit townhome (ITE 230) | 28 | units | 1.38 spaces/unit | 39 | | |
| Single-Family Home (ITE 210) | 42 | units | 1.83/unit | 77 | | |
| Total | | | | 1,645 | 2,057 | 412 |

¹ Parking demand for Convention Center was applied for the Conference Center land use. The number of attendees was calculated based on 20 sqft/attendee.

² It is assumed that the café and boat rental uses would occupy the same amount of area (4,000 sqft each). Parking demand for Coffee/Donut Shop was applied for the café land use. As parking demand data are not available for boat rental use, the City's code requirement for Marine Sales was applied for the Boat Rental land use.

In contrast to the parking requirement comparison, the parking demand analysis indicated that the Project's proposed parking supply of 2,057 spaces would exceed demand by 412 spaces. The exceedance can be attributed to how residential parking is projected. ITE's parking data do not differentiate between the number of bedrooms in each residential unit. For example, a 1-bedroom condo unit is projected to generate the same parking demand as a 3-bedroom townhouse unit. As a result, the proposed supply for residential uses, which was based on the City's requirements, is much higher than the projected demand. Aside from residential uses, the hotel, including banquet facilities, the office and the library uses would all generate lower demand than the proposed supply.

OTHER PARKING CONSIDERATIONS

The mixed-use nature of the proposed Project with restaurants, hotel, conference center, offices, residential units, parks and other amenities all located within walking distance in a nice pedestrian-friendly environment allows some activities to stay within the site that would otherwise take place externally. In calculating the Project trip generation, it was assumed that such internal activities would reduce the vehicular traffic by up to 53 trips during a peak hour based on ITE guidelines. With fewer vehicular trips, the parking demand would be lowered as well.

The mixed-use nature would also help facilitate shared parking among the different uses. For instance, the north parking structure may serve as overflow parking for large events at the hotel or conference center in the evenings or weekends when the surrounding offices are closed. Weekend visitors to the public promenade may also park their vehicles or bicycles in the structure or in lots throughout the site. Visitors to the café and boat rental may be allowed to park in spaces that also serve residents of the South Mixed-Use residential units. For shared parking to be effective, parking spaces, particularly those for commercial uses, should be unrestricted. As the aforementioned example indicates, some residential parking spaces may also be shared and therefore should only have limited restriction, such as reserved residential parking through the City's Residential Parking Permit (RPP) program after 6 pm.

Because of these internal trip making and shared parking opportunities that would reduce the actual parking demand and the large difference between the parking requirement and the Projected parking demand, the City may consider allowing the Project to provide fewer parking spaces than dictated by the City's Zoning Code. However, the City may require the Project to re-evaluate the placements of the parking in order to better serve the needs of residents, workers and visitors. For example, some of the 80 parking spaces proposed for the library may be relocated as both the parking requirement and demand analyses indicated a need of fewer than 10 spaces to serve a library of 2,500 square feet.

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16. Transportation Research Board. *Highway Capacity Manual*, 2010.

STUDY PARTICIPANTS

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PlaceWorks

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Appendix 1 Transportation Terminology



Several traffic analysis concepts were used to evaluate the Project's impacts on the existing and future transportation system. The following is an explanation of traffic terminology used in this report.

Level of Service (LOS)

"Levels of service" describe the operating conditions experienced by motorists during peak times of travel. Level of service (LOS) is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, driving comfort and convenience. Levels of service are designated "A" through "F" from best to worst, which cover the entire range of traffic operations that might occur. Level of Service (LOS) "A" through "E" generally represent traffic volumes at less than intersection capacity, while LOS "F" represents over capacity and/or significant delays.

Traffic Analysis Zones (TAZ)

The Alameda Countywide Travel Demand Model was used to estimate future traffic volumes. In order to forecast traffic generated by land uses, the Model divides the region into Traffic Analysis Zones (TAZs), which contain information on existing and projected land uses. Each TAZ is connected to the adjacent street network via one or more connectors, which provide access to and from the TAZ. Depending on the type of land uses allocated to each zone, the Model would Project a certain combination of outbound trips (trip production) and inbound trips (trip attraction) during the analysis periods.

Peak Hour Factor (PHF)

A peak hour factor is a measure of fluctuation in vehicle flow. In urban and suburban areas, PHFs are generally found to be in the range of 0.70 to 1.00. PHFs closer to 1.00 reflect locations where the vehicle flow is consistent and uniform, whereas PHFs with less than 0.80 tend to be locations with more erratic vehicle flow. When a PHF is unknown, default values of 0.90 to 0.95 tend to be used. PHF is calculated by dividing the total vehicles entering and leaving an intersection in an hour by four times the highest 15-minute increment of vehicles in that same hour.

Substandard versus Impact

"Substandard" is a term used in this report to identify locations that are operating below acceptable traffic operation standards. These standards and thresholds are established by the City of San Leandro, the Alameda County Transportation Commission, and/or the California Department of Transportation (Caltrans). A "Significant Impact" is identified when the Project causes locations to degrade to substandard level based on the City's standards or adds considerable delay to locations that would operate at sub-standard level without the Project.

Bicycle Terminology

- Bikeways that are indicated by pavement markings and/or signage. There are generally three classes of bikeways:
 - Class I (Paths) - Trails that are exclusively for non-motorized access and are typically shared with pedestrians and/or equestrians
 - Class II (Bike Lanes) – Marked lanes on roadways for exclusive use by bicyclists
 - Class III (Bike Routes) – Roadways in which bicyclists and motorists share the travel lane.
- All of these bikeways may be supplemented with signage and/or bicycle symbol pavement markings. The lack of bicycle designations on city streets does not preclude bicycle usage, as they are defined as a vehicle in the California Vehicle Code and subject to the same rules governing motor vehicles
- Bicycle parking, which includes two classes of facilities:
 - Short-term parking, typically U-racks or wave racks, are recommended in locations close to building entrances for customers and visitors.
 - Long-term parking, most likely provided in secure locations with controlled access or surveillance, is recommended for employees, students, and train stations. Intersection aids, such as bicycle detection at actuated traffic signals with pavement markings, bike boxes at signalized intersections, and colored bike lanes at potential motorist-bicyclist conflict points (such as at freeway entrances).
- Amenities, such as employee locker/ showering facilities, benches, water fountains, maps, and directional signage with mileage indications to key destinations.

Pedestrian Terminology

Pedestrian facilities are made up of several components and may include the following:

- Walkways, such as sidewalks, paths, and roadway shoulders, which provide exclusive access to pedestrian circulation and adequate widths for walking that are free of obstructions. On high-volume and/or high-speed roadways, buffers are needed to provide greater separation from roadway traffic to create a more conducive walking environment. Buffers, which are areas between the curb and walkway, often house utilities, street furniture, and landscaping
- Intersection crossing aids, such as marked crosswalks, pedestrian bulb-outs, in-pavement flashers, raised crosswalks, median pedestrian refuges, pedestrian-actuated signalization with visual and audible pedestrian signal heads, and curb ramps with detectable warnings.
- Landscaping, such as trees, bushes, and other foliage, can provide shade from the sun and overhead protection during inclement weather, create a more pleasant walking environment, and may absorb noise and pollution from the roadway if placed in the buffer zone.
- Amenities, such as benches, water fountains, pedestrian-scaled lighting, refuse cans, mailboxes, newspaper stands, maps and directional signage.

Additionally, pedestrian activity is encouraged for routine and recreational purposes by providing and maintaining walkway facilities on both sides of all roadways, allowing pedestrians to cross all

intersection legs, orienting buildings towards walkways rather than parking lots, and providing easy, continuous, direct path to and from activity centers. Pedestrian activity is discouraged by locating dead spaces (fences, blank walls, surface parking) next to walkways, designing limited access roadways (cul-de-sacs, long stretches of road with no intersections) with no pedestrian access points, high-volume or high-speed roadways with inadequate walkway widths and no buffers, and large turning radii at intersections.

Appendix 2 Internal Trip Worksheet



**MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Proposed Project**

Analyst: Kittelson

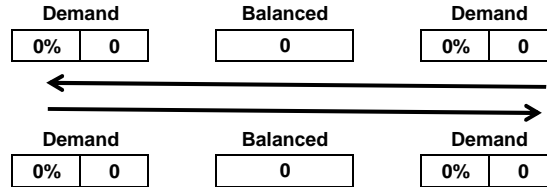
Name of Development: San Leandro Shoreline

Date: 4/9/2014

AM Peak Hour

Land Use A: Hotel

| | | | | | |
|---------------------|-------|-------------|----------|-------------|--|
| | | ITE LU Code | | 310 | |
| Exit to External | | Size | | 200.0 rooms | |
| 43 | | Total | Internal | External | |
| | Enter | 63 | 0 | 63 | |
| | Exit | 43 | 0 | 43 | |
| 63 | Total | 106 | 0 | 106 | |
| Enter from External | % | 100 | 0% | 100% | |



Land Use B: Conference Center

| | | | | | |
|-------|-------|-------------|----------|---------------------|--|
| | | ITE LU Code | | n/a | |
| | | Size | | 15.0 ksf | |
| | Total | Internal | External | Enter from External | |
| | Enter | 281 | 0 | 281 | |
| | Exit | 50 | 0 | 50 | |
| Total | 331 | 0 | 331 | 50 | |
| % | 100 | 0% | 100% | Exit to External | |

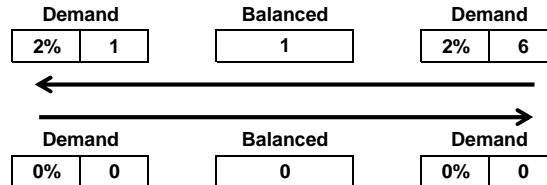
Note: Midday peak hour internal capture rates were used for the AM peak hour.

| Net External Trips for Multi-use Development | | | | |
|--|------------|------------|-------|------------------|
| | LAND USE A | LAND USE B | TOTAL | |
| Enter | 63 | 281 | 344 | |
| Exit | 43 | 50 | 93 | |
| Total | 106 | 331 | 437 | |
| Single-Use Trip Generation Est. | 106 | 331 | 437 | INTERNAL CAPTURE |
| | | | | 0% |

PM Peak Hour

Land Use A: Hotel

| | | | | | |
|---------------------|-------|-------------|----------|-------------|--|
| | | ITE LU Code | | 310 | |
| Exit to External | | Size | | 200.0 units | |
| 59 | | Total | Internal | External | |
| | Enter | 61 | 1 | 60 | |
| | Exit | 59 | 0 | 59 | |
| 60 | Total | 120 | 1 | 119 | |
| Enter from External | % | 100 | 1% | 99% | |



Land Use B: Conference Center

| | | | | | |
|-------|-------|-------------|----------|---------------------|--|
| | | ITE LU Code | | Various | |
| | | Size | | 15.0 ksf | |
| | Total | Internal | External | Enter from External | |
| | Enter | 50 | 0 | 50 | |
| | Exit | 281 | 1 | 280 | |
| Total | 331 | 1 | 330 | 280 | |
| % | 100 | 0% | 100% | Exit to External | |

| Net External Trips for Multi-use Development | | | | |
|--|------------|------------|-------|------------------|
| | LAND USE A | LAND USE B | TOTAL | |
| Enter | 60 | 50 | 110 | |
| Exit | 59 | 280 | 339 | |
| Total | 119 | 330 | 449 | |
| Single-Use Trip Generation Est. | 120 | 331 | 451 | INTERNAL CAPTURE |
| | | | | 1% |

**MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Proposed Project**

Analyst: Kittelson

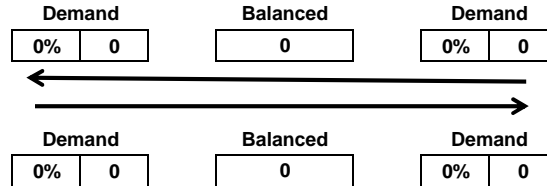
Name of Development: San Leandro Shoreline

Date: 8/21/2014

Saturday Peak Hour

Land Use A: Hotel

| | | | | | |
|---------------------|-------|-------------|----------|-------------|--|
| | | ITE LU Code | | 210/220 | |
| Exit to External | | Size | | 200.0 units | |
| 62 | | Total | Internal | External | |
| Enter | 80 | 0 | 80 | | |
| Exit | 62 | 0 | 62 | | |
| 80 | Total | 142 | 0 | 142 | |
| Enter from External | % | 100 | 0% | 100% | |



Land Use B: Conference Center

| | | | | | |
|-------|-----|-------------|----------|------------------|---------------------|
| | | ITE LU Code | | Various | |
| | | Size | | 15.0 ksf | |
| | | Total | Internal | External | Enter from External |
| Enter | 140 | 0 | 140 | | |
| Exit | 25 | 0 | 25 | | |
| Total | 165 | 0 | 165 | | |
| % | 100 | 0% | 100% | | |
| | | | | Exit to External | |
| | | | | 25 | |

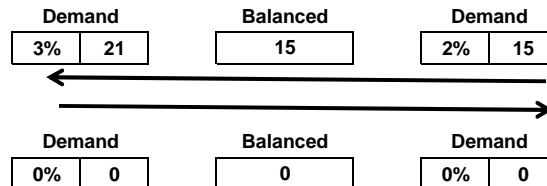
Note: Midday peak hour internal capture rates were used for the Saturday peak hour.

| Net External Trips for Multi-use Development | | | | |
|--|------------|------------|-------|------------------|
| | LAND USE A | LAND USE B | TOTAL | |
| Enter | 80 | 140 | 220 | |
| Exit | 62 | 25 | 87 | |
| Total | 142 | 165 | 307 | |
| Single-Use Trip Generation Est. | 142 | 165 | 307 | INTERNAL CAPTURE |
| | | | 0% | |

Weekday

Land Use A: Hotel

| | | | | | |
|---------------------|-------|-------------|----------|-------------|--|
| | | ITE LU Code | | 210/220 | |
| Exit to External | | Size | | 200.0 units | |
| 709 | | Total | Internal | External | |
| Enter | 709 | 15 | 694 | | |
| Exit | 709 | 0 | 709 | | |
| 694 | Total | 1,417 | 15 | 1402 | |
| Enter from External | % | 100 | 1% | 99% | |



Land Use B: Conference Center

| | | | | | |
|-------|-------|-------------|----------|------------------|---------------------|
| | | ITE LU Code | | Various | |
| | | Size | | 15.0 ksf | |
| | | Total | Internal | External | Enter from External |
| Enter | 750 | 0 | 750 | | |
| Exit | 750 | 15 | 735 | | |
| Total | 1,500 | 15 | 1485 | | |
| % | 100 | 1% | 99% | | |
| | | | | Exit to External | |
| | | | | 735 | |

| Net External Trips for Multi-use Development | | | | |
|--|------------|------------|-------|------------------|
| | LAND USE A | LAND USE B | TOTAL | |
| Enter | 694 | 750 | 1444 | |
| Exit | 709 | 735 | 1444 | |
| Total | 1402 | 1485 | 2887 | |
| Single-Use Trip Generation Est. | 1417 | 1500 | 2917 | INTERNAL CAPTURE |
| | | | 1% | |

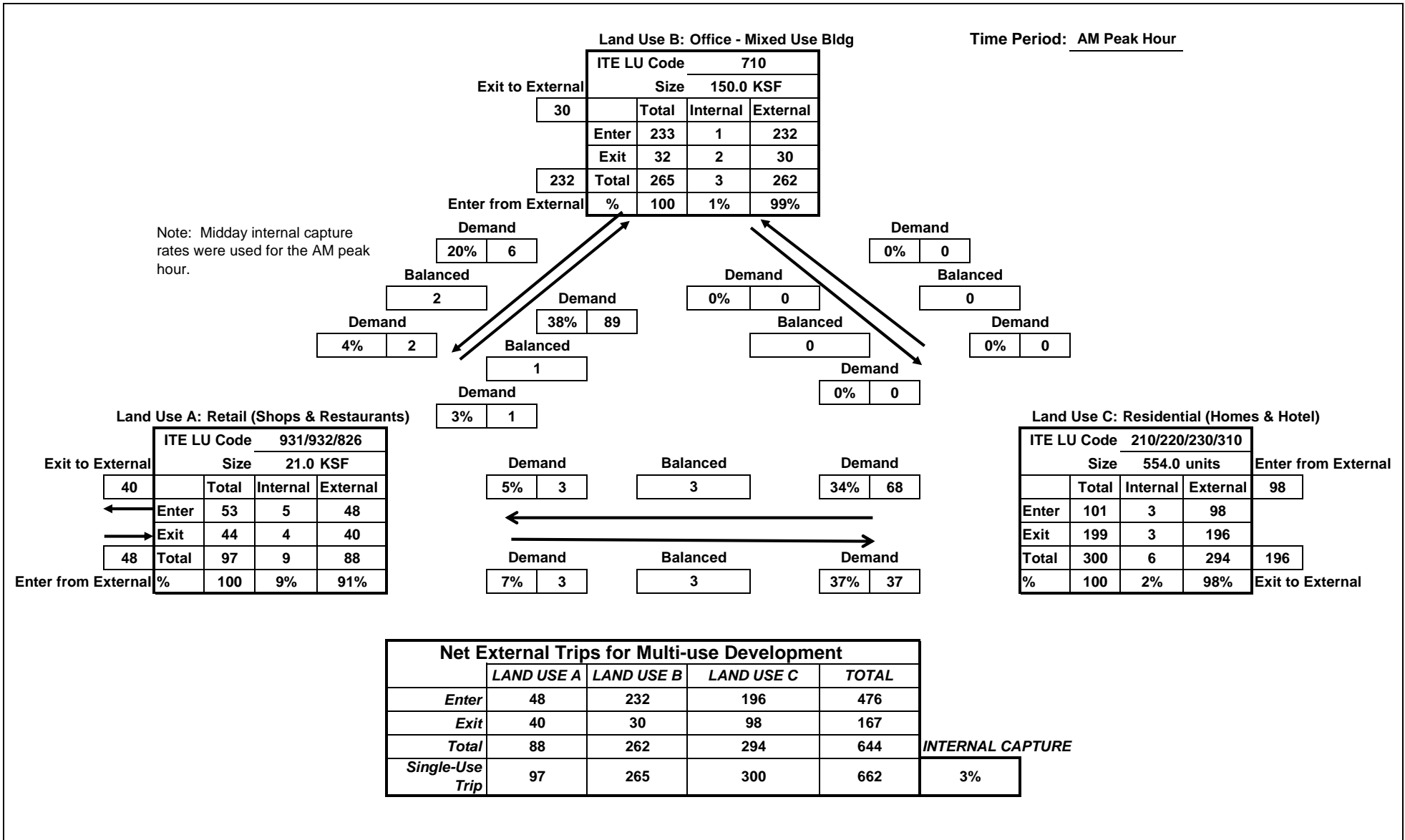
Source: Trip Generation Manual 9th Edition Vol 1: User's Guide and Handbook

**MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Proposed Project**

Analyst: Kittelson

Name of Development: San Leandro Shoreline

Date: 4/9/2014

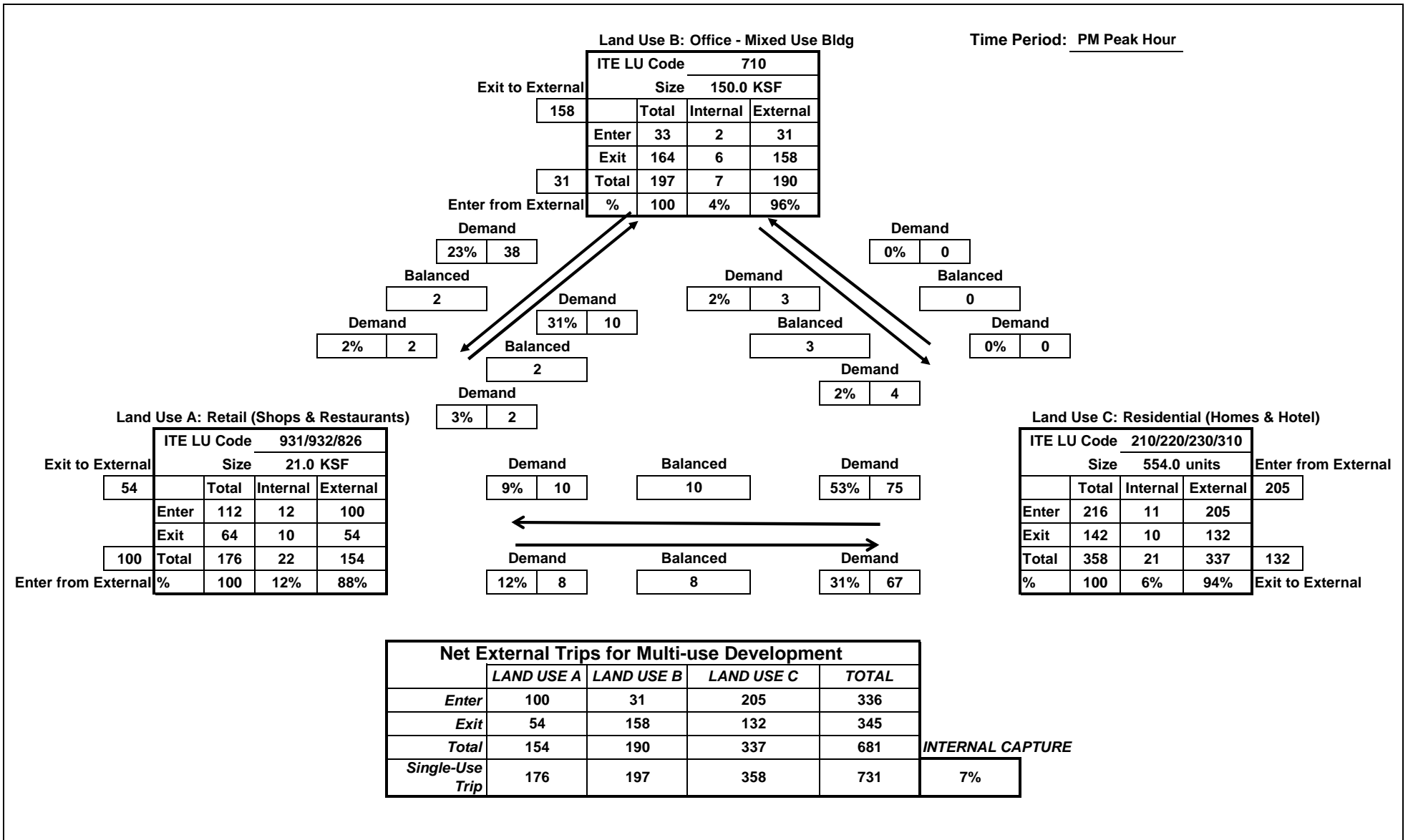


**MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Proposed Project**

Analyst: Kittelson

Name of Development: San Leandro Shoreline

Date: 4/9/2014



**MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Proposed Project**

Analyst: Kittelson

Name of Development: San Leandro Shoreline

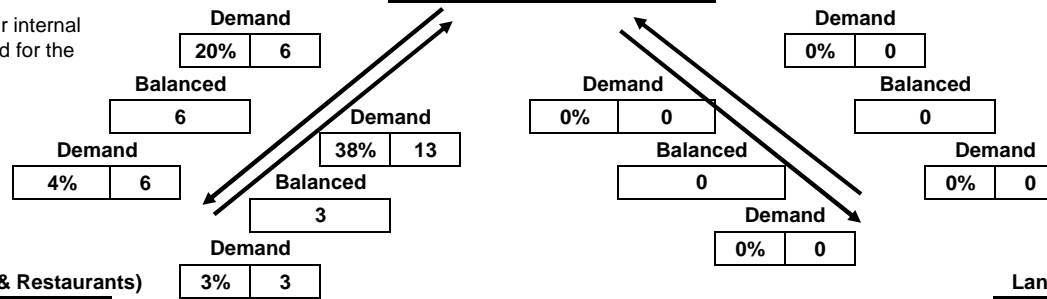
Date: 8/21/2014

Time Period: Saturday Peak Hour

Land Use B: Office - Mixed Use Bldg

| | | | | |
|---------------------|-------|-----------|----------|----------|
| ITE LU Code | | 710 | | |
| Size | | 150.0 KSF | | |
| Exit to External | 24 | Total | Internal | External |
| Enter | 35 | 3 | 32 | |
| Exit | 30 | 6 | 24 | |
| 32 | Total | 65 | 9 | 56 |
| Enter from External | % | 100 | 14% | 86% |

Note: Midday peak hour internal capture rates were used for the Saturday peak hour.



Land Use A: Retail (Shops & Restaurants)

| | | | | |
|---------------------|-------|-------------|----------|----------|
| ITE LU Code | | 931/932/826 | | |
| Size | | 21.0 KSF | | |
| Exit to External | 100 | Total | Internal | External |
| Enter | 143 | 13 | 130 | |
| Exit | 111 | 11 | 100 | |
| 130 | Total | 254 | 24 | 230 |
| Enter from External | % | 100 | 9% | 91% |

Land Use C: Residential (Homes & Hotel)

| | | | | |
|---------------------|-------|-----------------|----------|----------|
| ITE LU Code | | 210/220/230/310 | | |
| Size | | 554.0 units | | |
| Enter from External | 186 | Total | Internal | External |
| Enter | 194 | 8 | 186 | |
| Exit | 165 | 7 | 158 | |
| 158 | Total | 359 | 15 | 344 |
| Exit to External | % | 100 | 4% | 96% |

| Net External Trips for Multi-use Development | | | | |
|--|------------|------------|------------|-------|
| | LAND USE A | LAND USE B | LAND USE C | TOTAL |
| Enter | 130 | 32 | 186 | 348 |
| Exit | 100 | 24 | 158 | 282 |
| Total | 230 | 56 | 344 | 630 |
| Single-Use Trip | 254 | 65 | 359 | 678 |

INTERNAL CAPTURE

| |
|----|
| 7% |
|----|

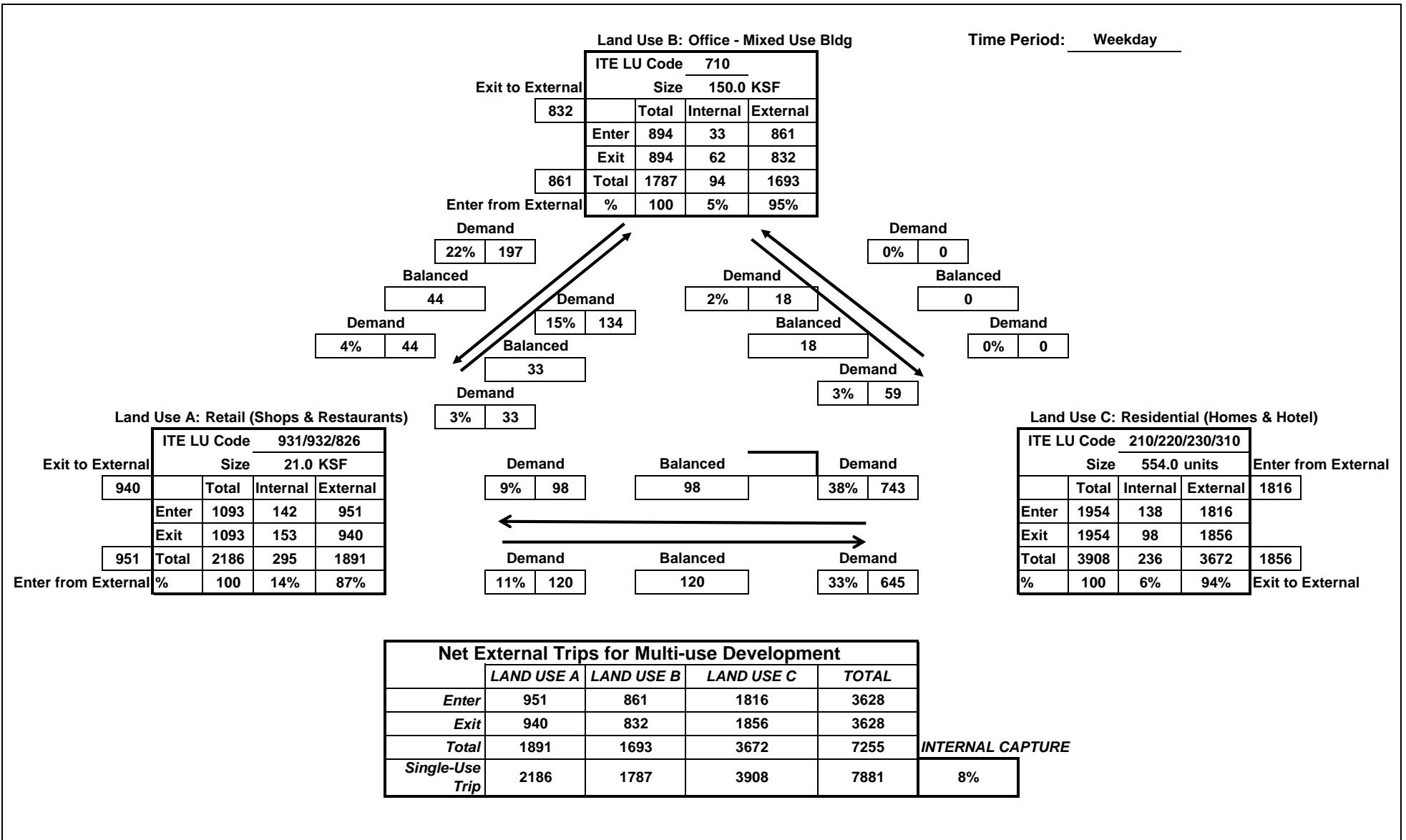
**MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Proposed Project**

Analyst: Kittelson

Name of Development: San Leandro Shoreline

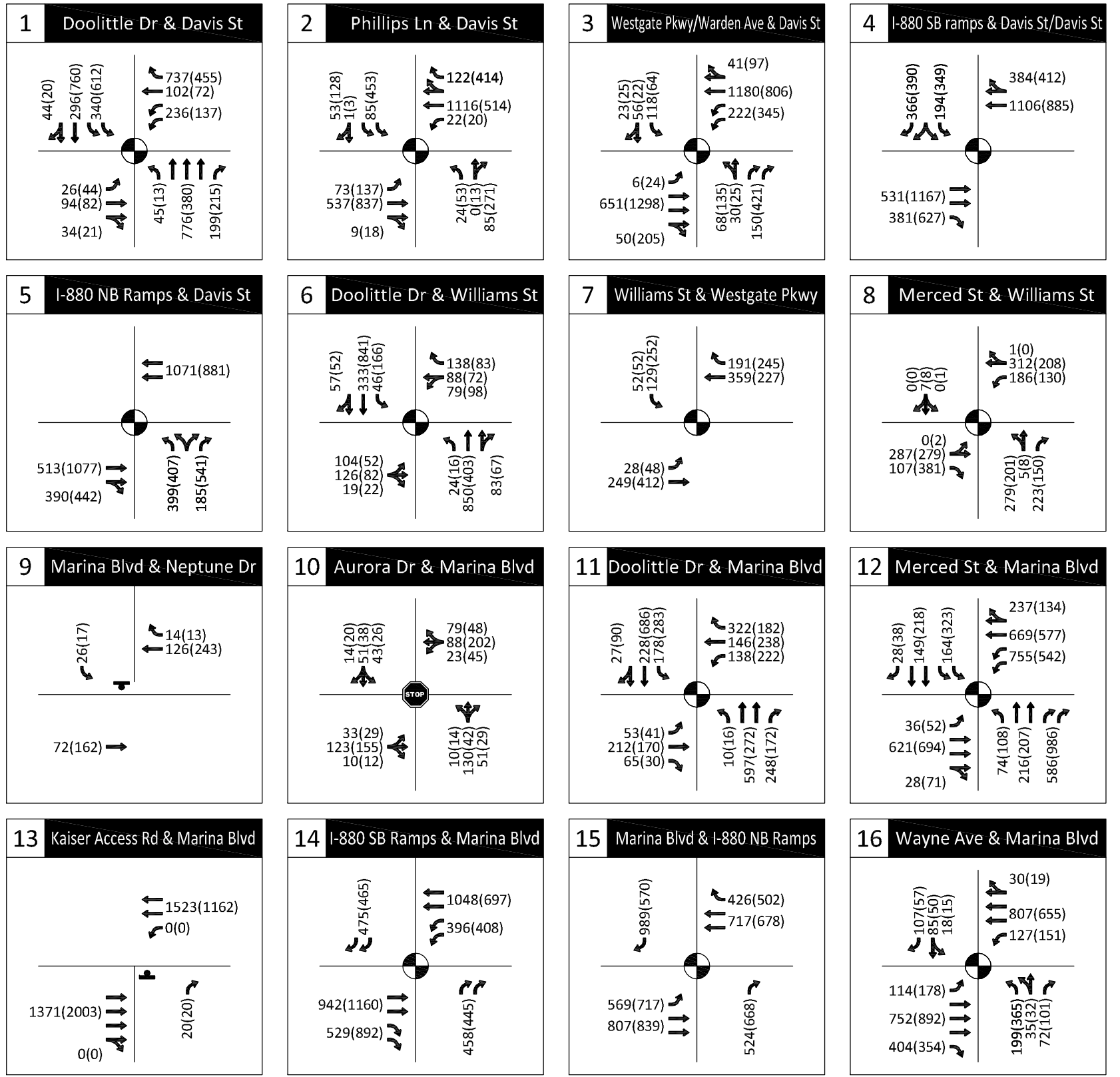
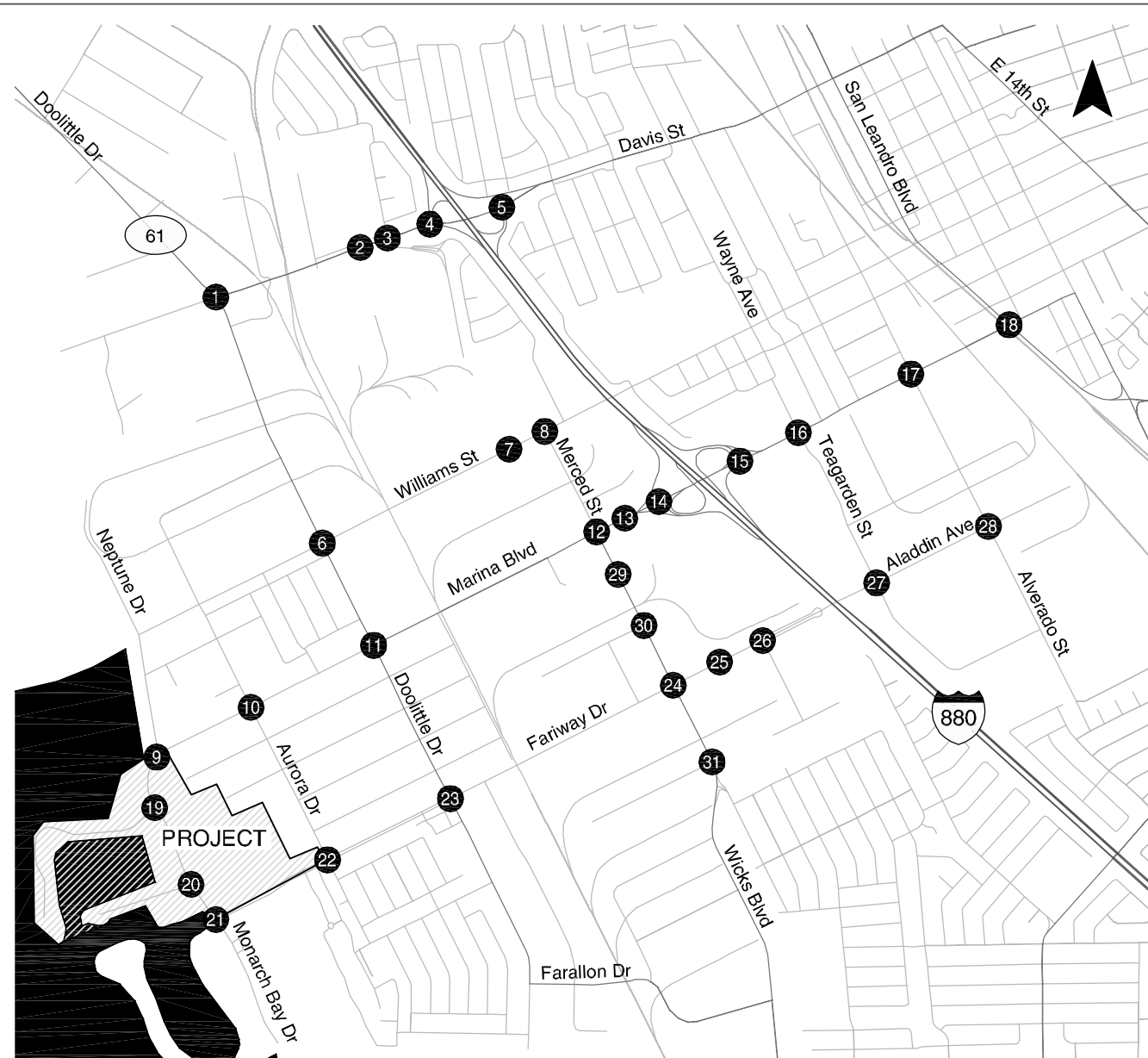
Date: 8/21/2014

Time Period: Weekday



Appendix 3 Intersection Turning Movement Volume Figures

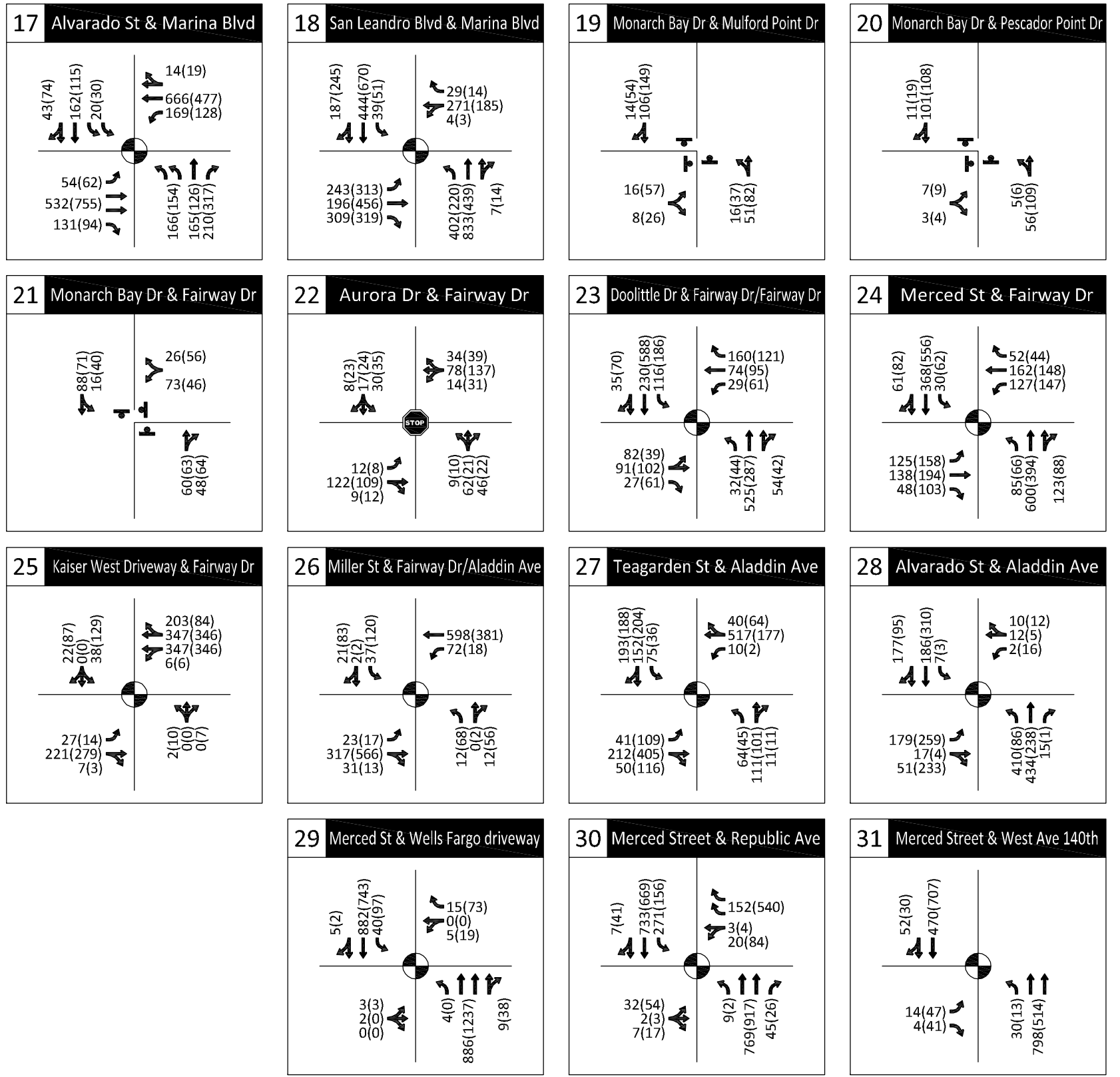
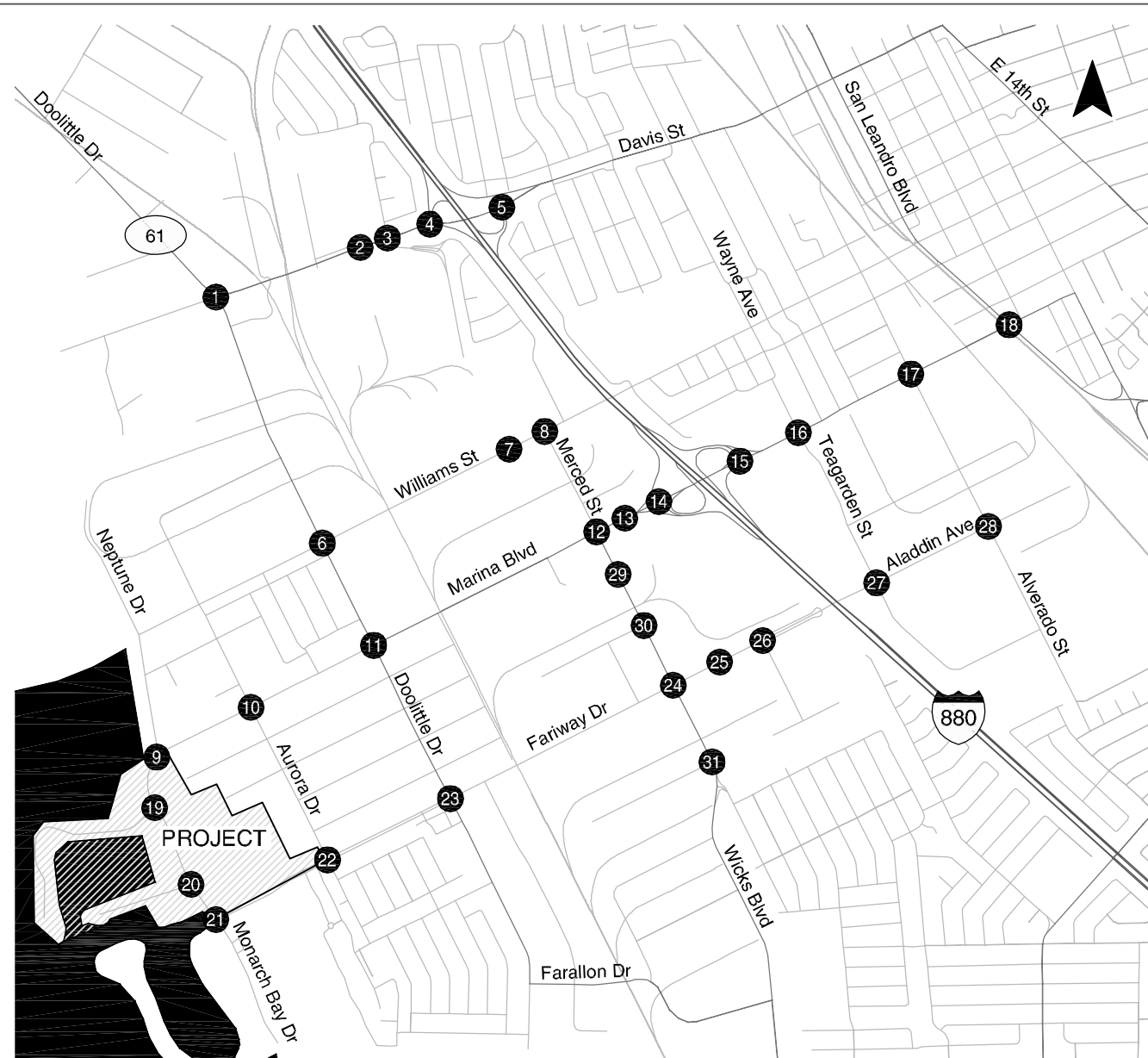




AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Baseline
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

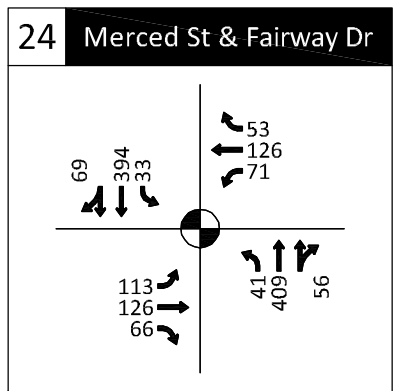
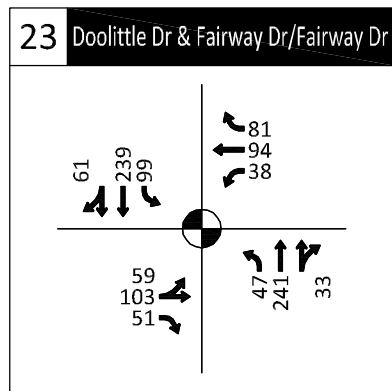
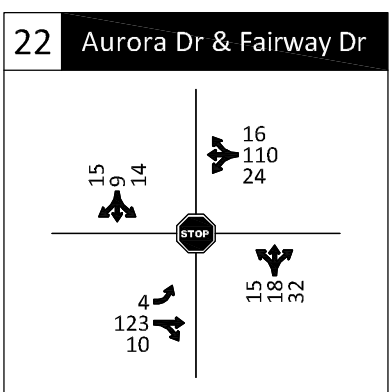
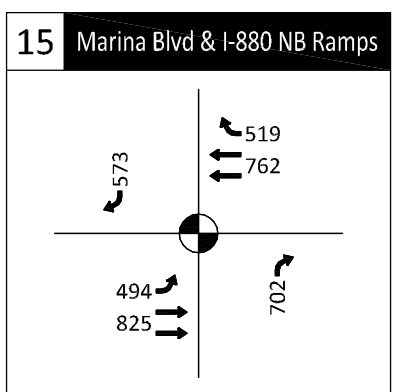
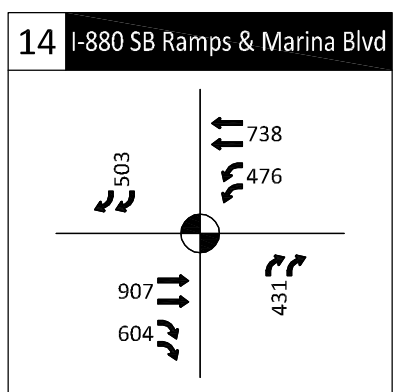
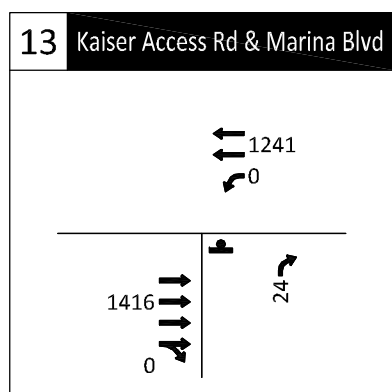
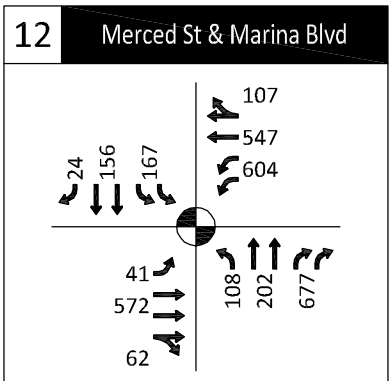
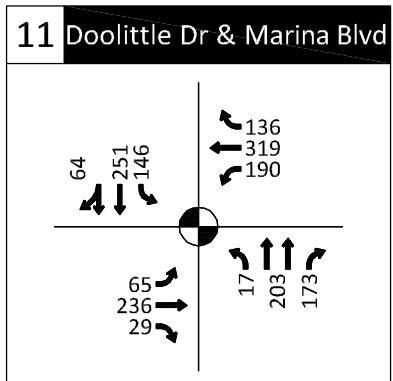
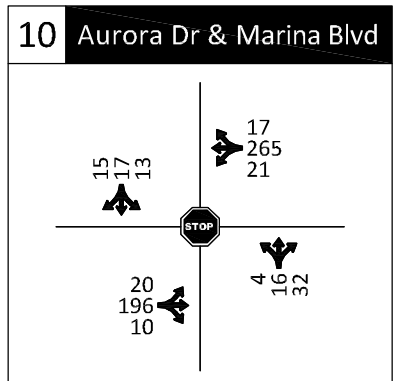
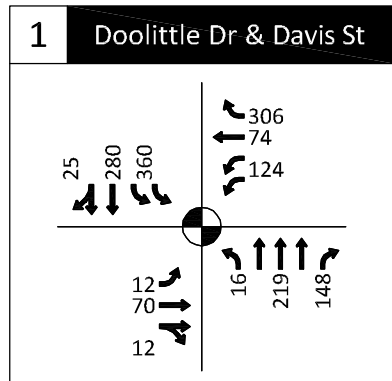
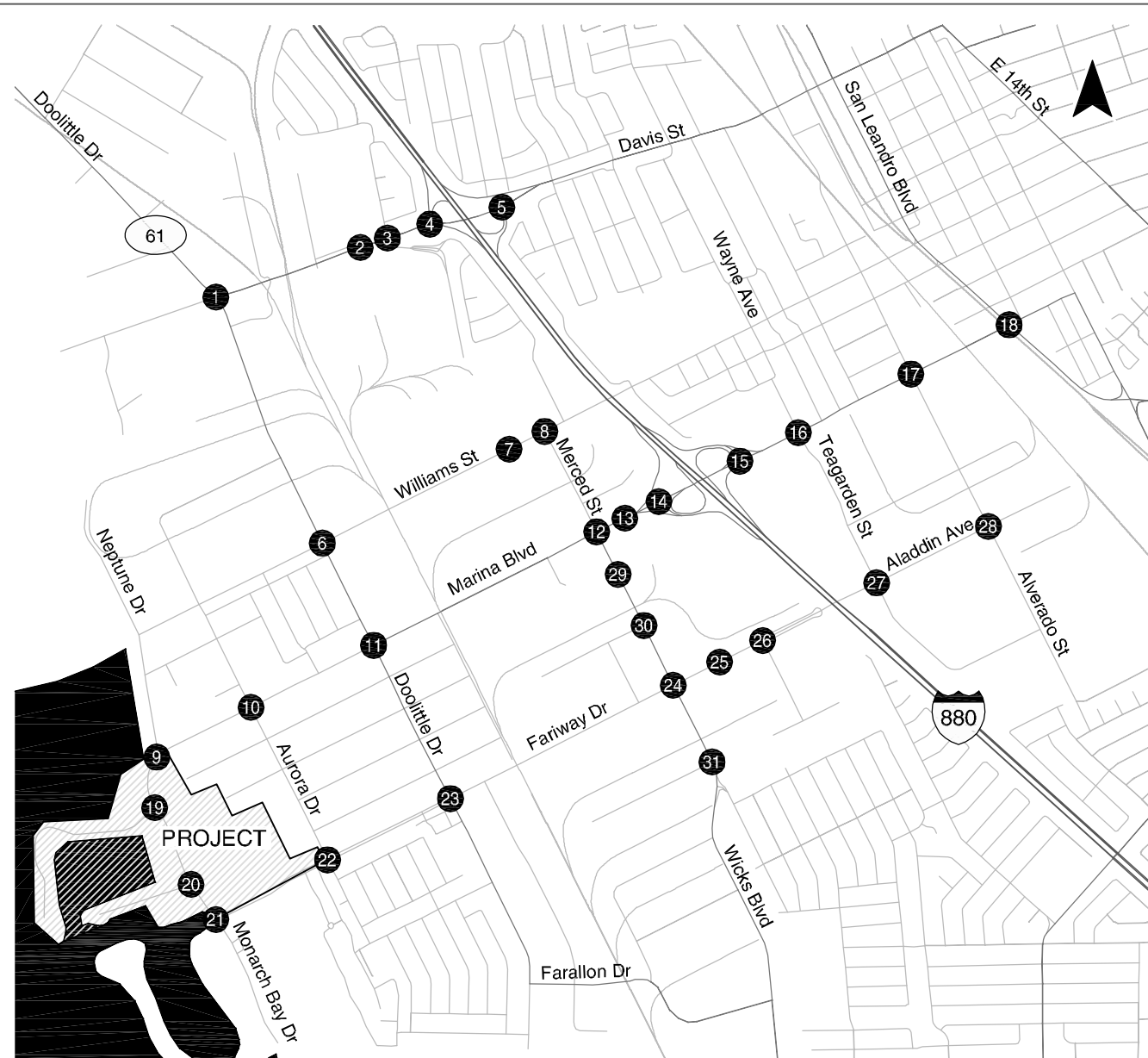
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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Baseline
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

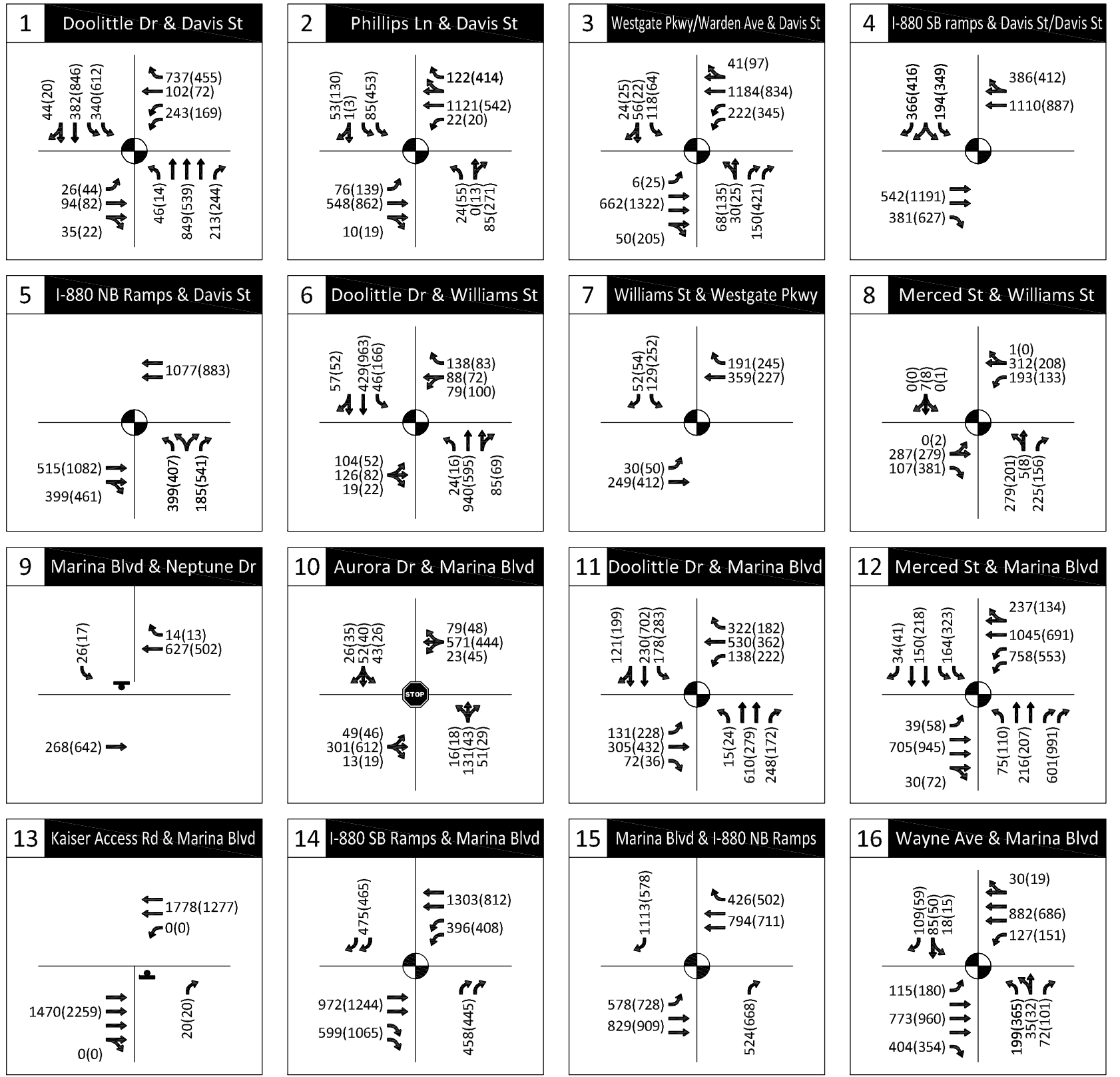
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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

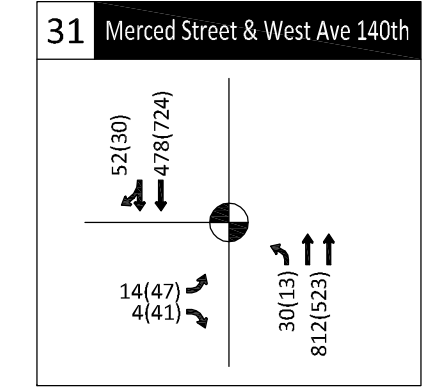
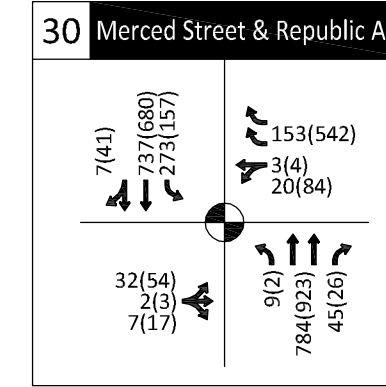
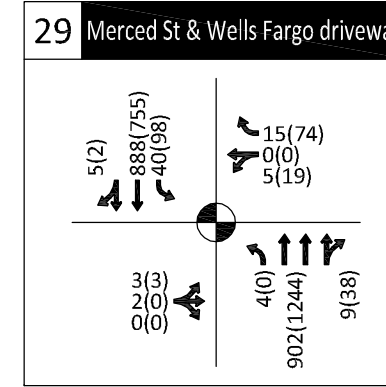
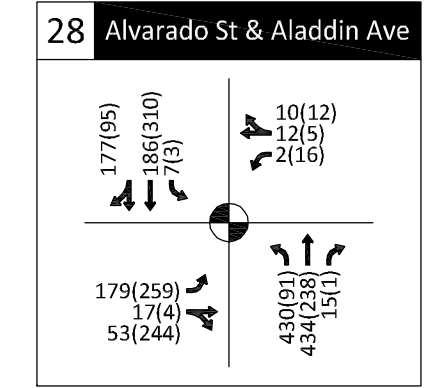
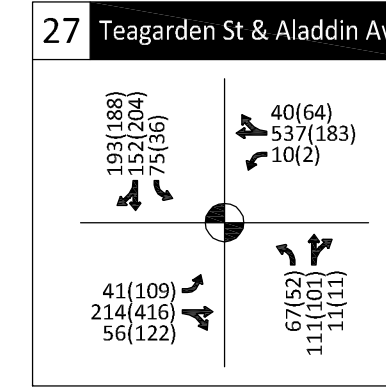
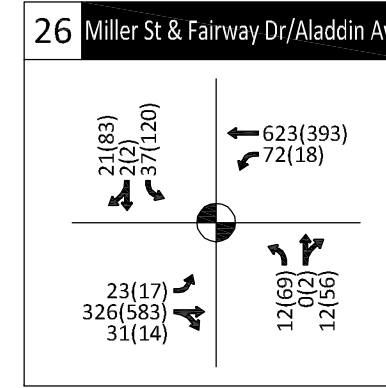
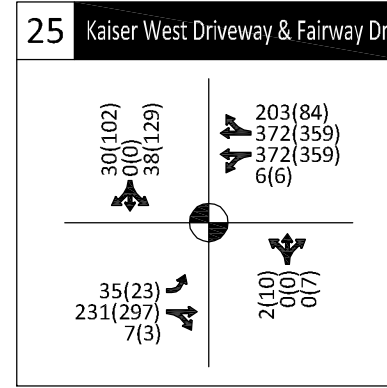
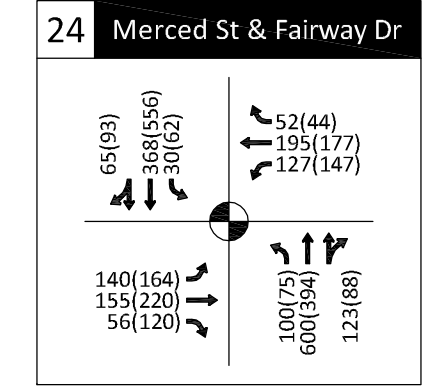
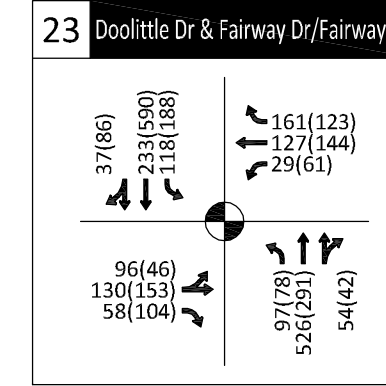
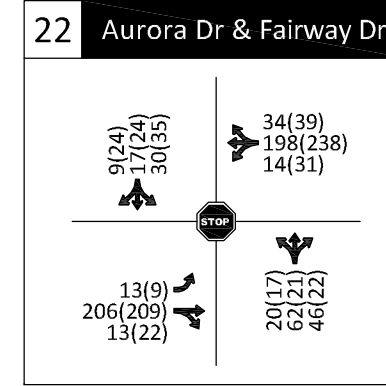
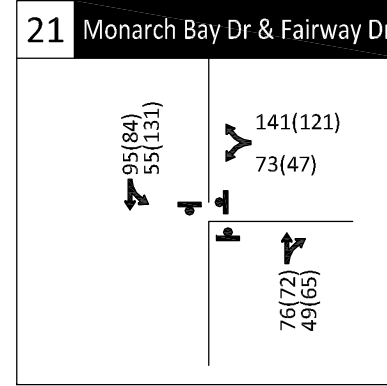
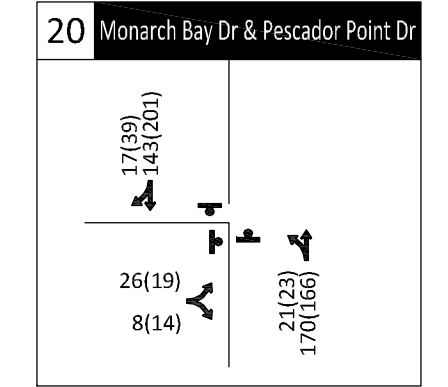
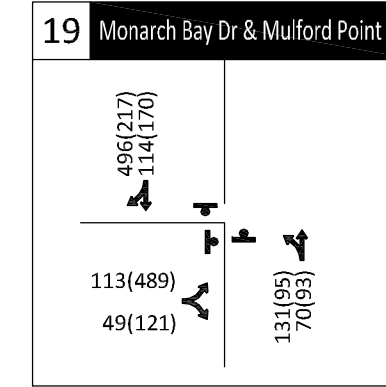
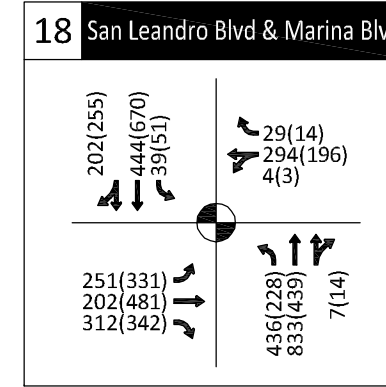
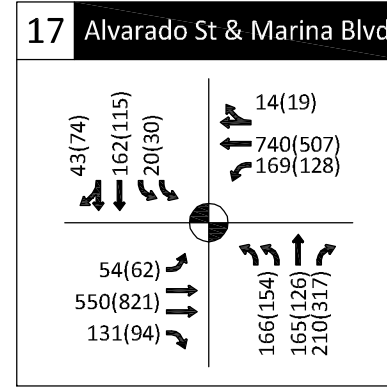
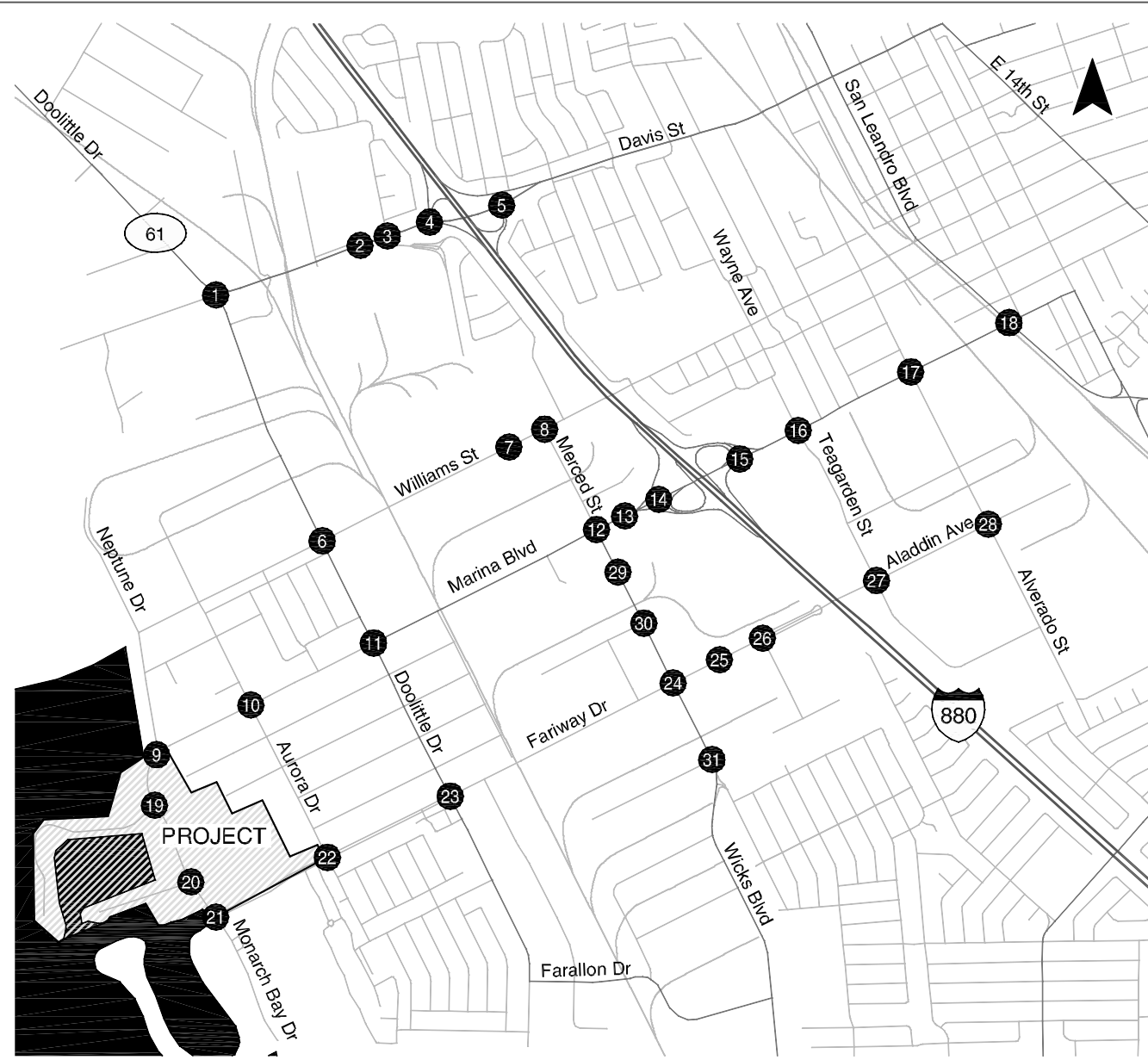
Baseline
 Saturday Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

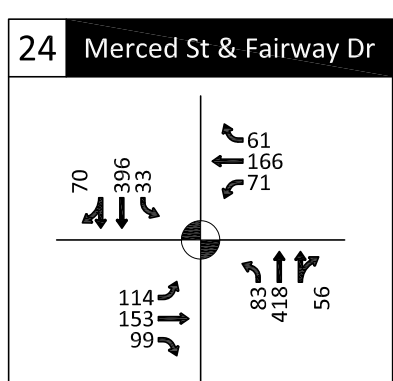
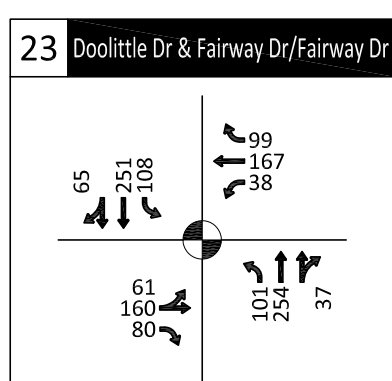
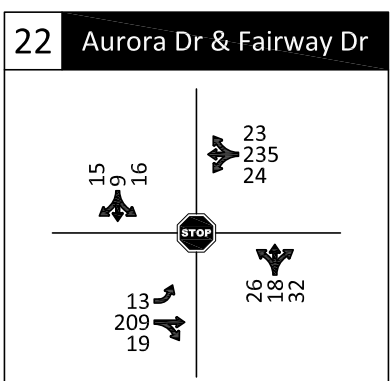
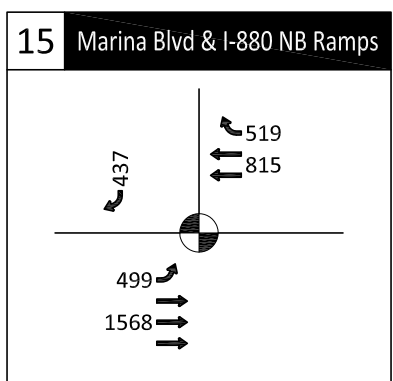
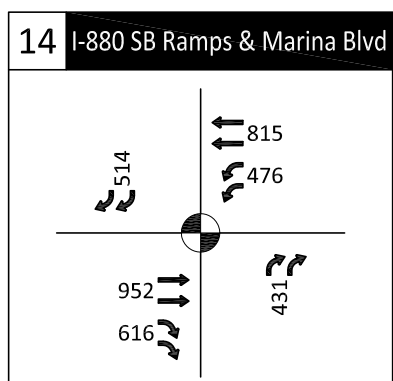
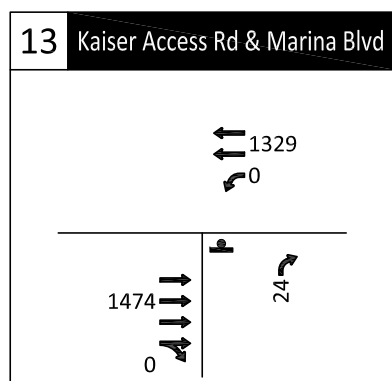
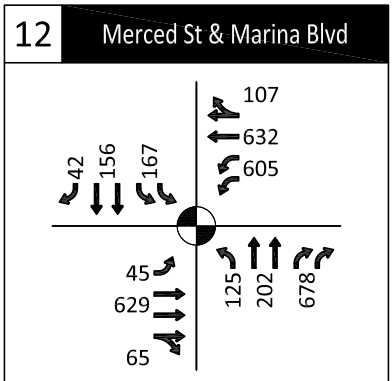
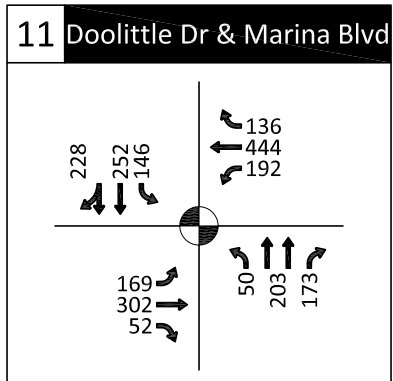
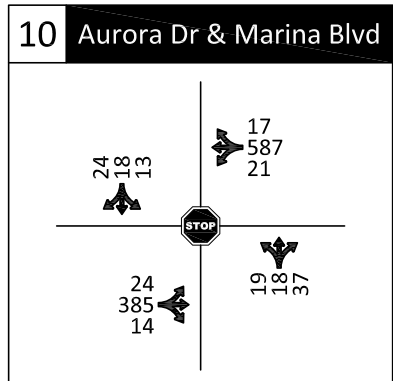
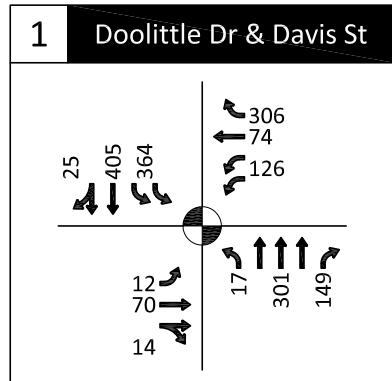
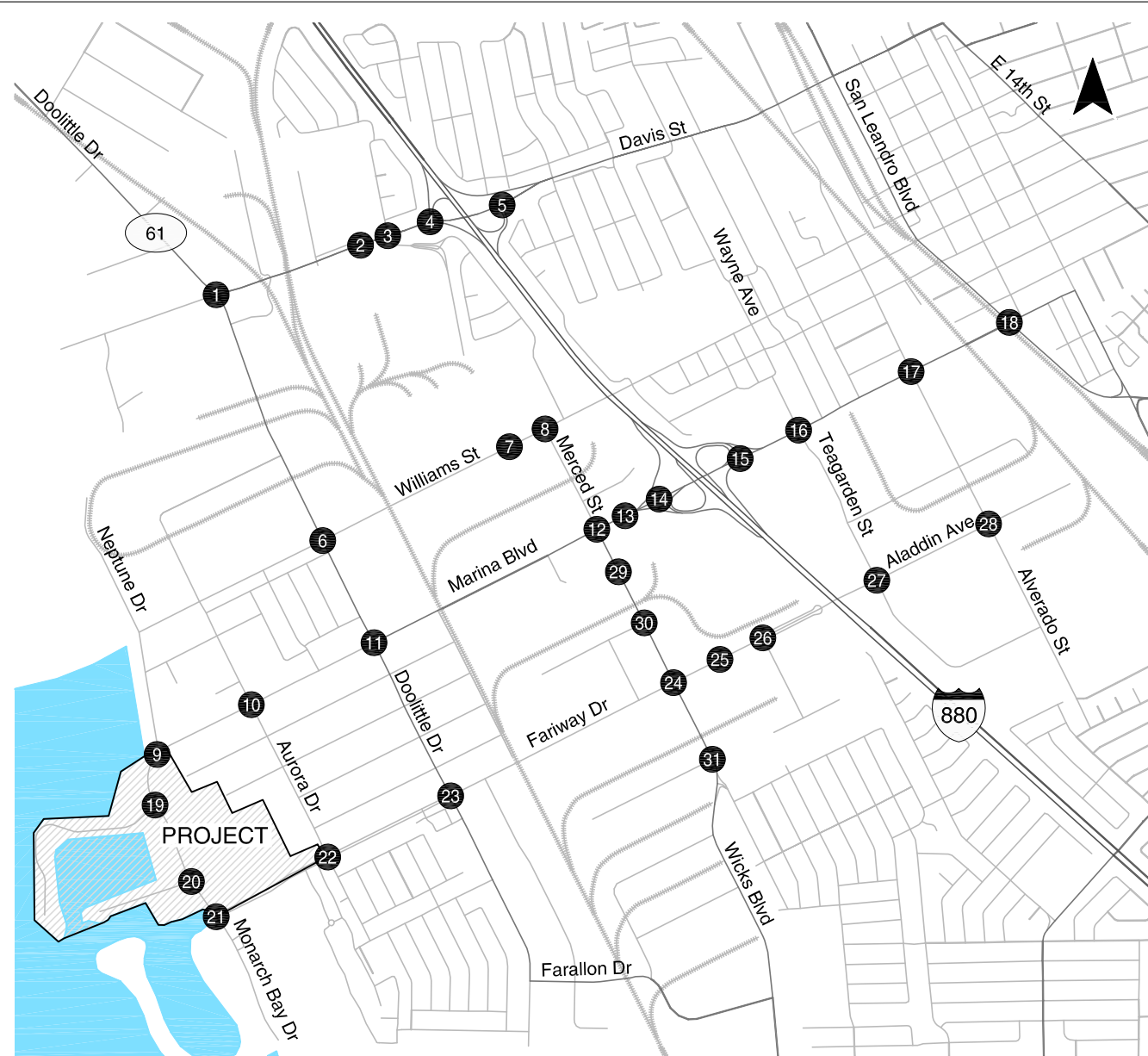
Baseline Plus Project
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

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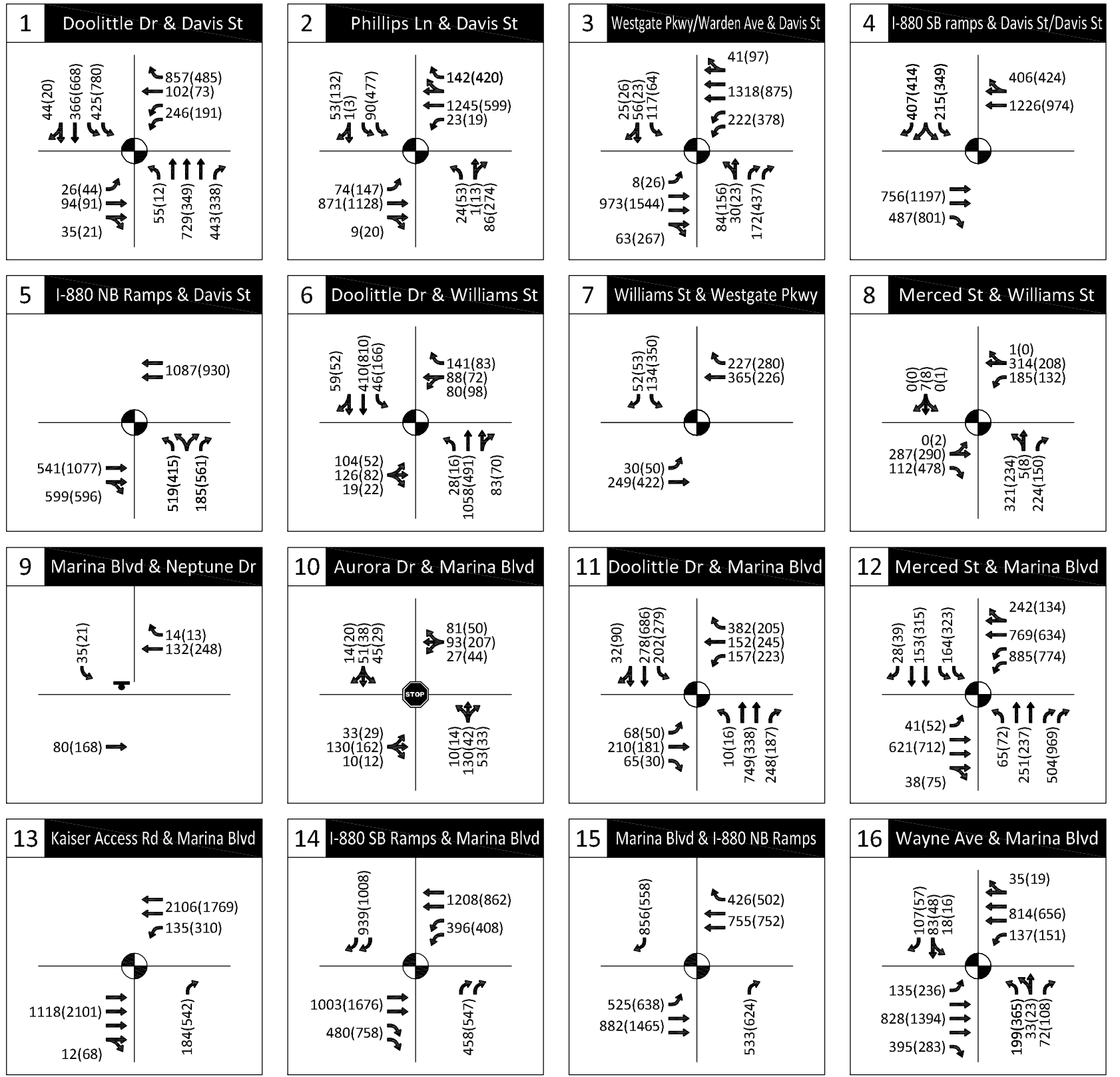
AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
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Baseline Plus Project
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

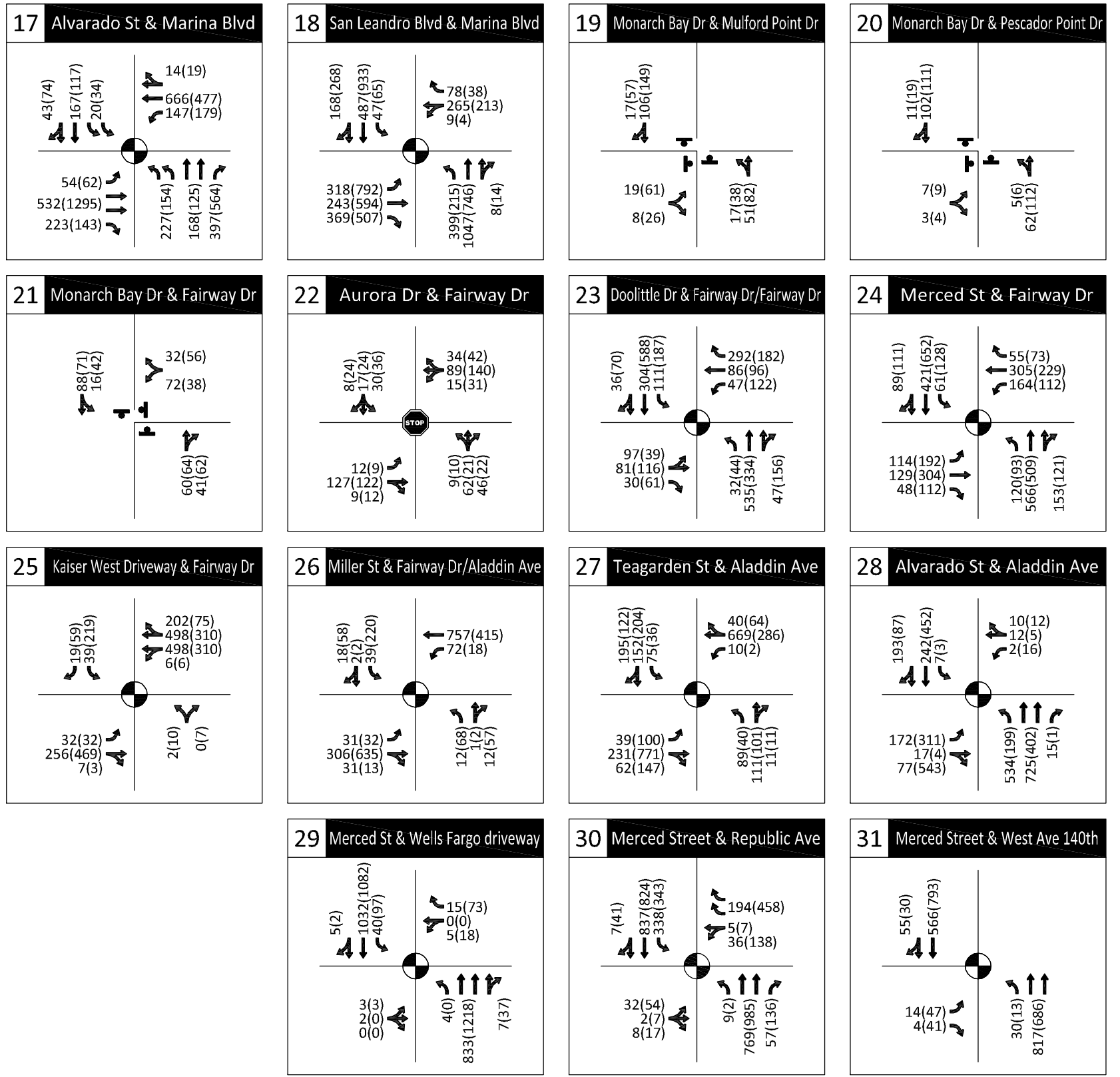
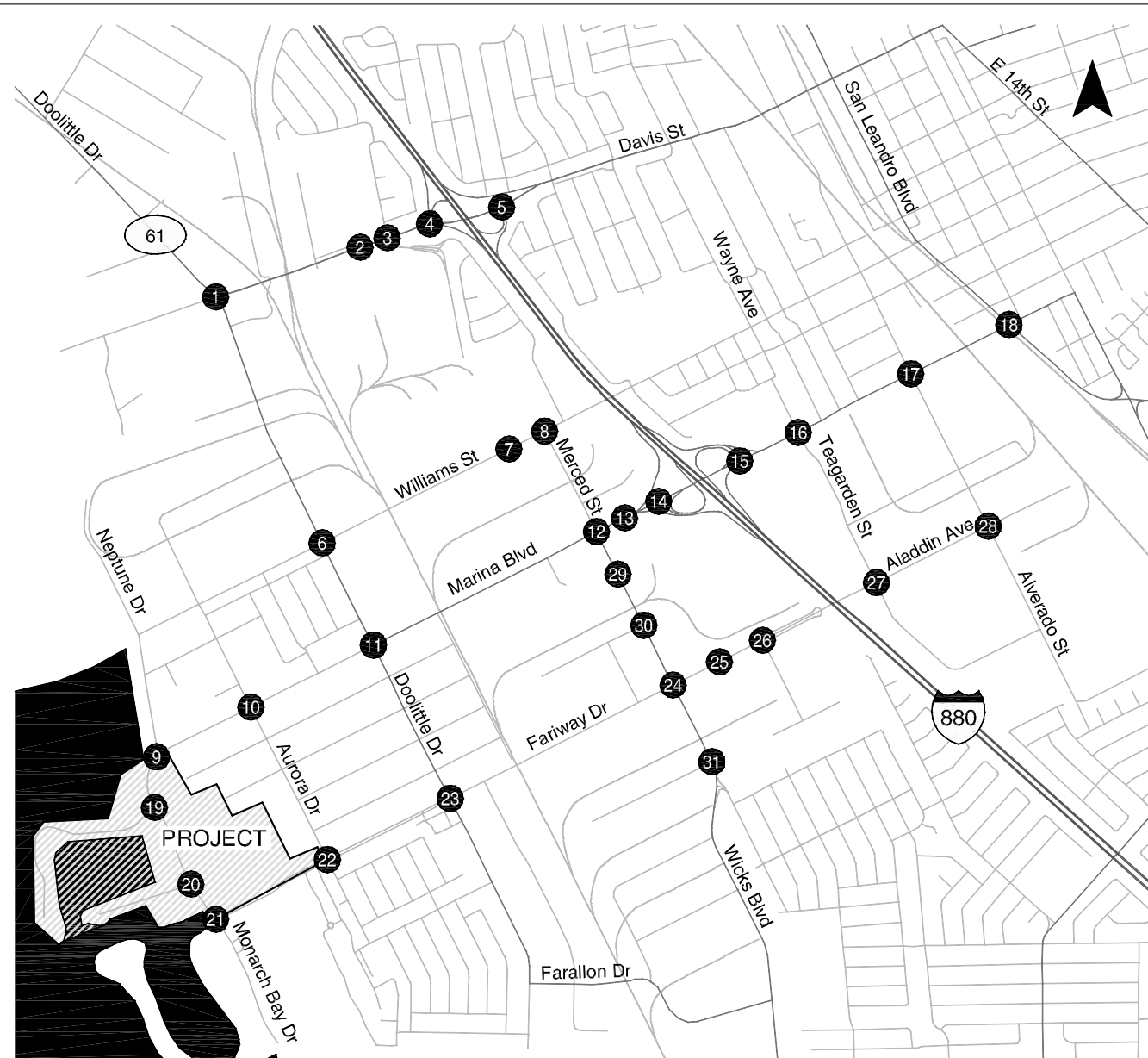
Baseline Plus Project
 Saturday Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 Near-Term Cumulative
 San Leandro, California

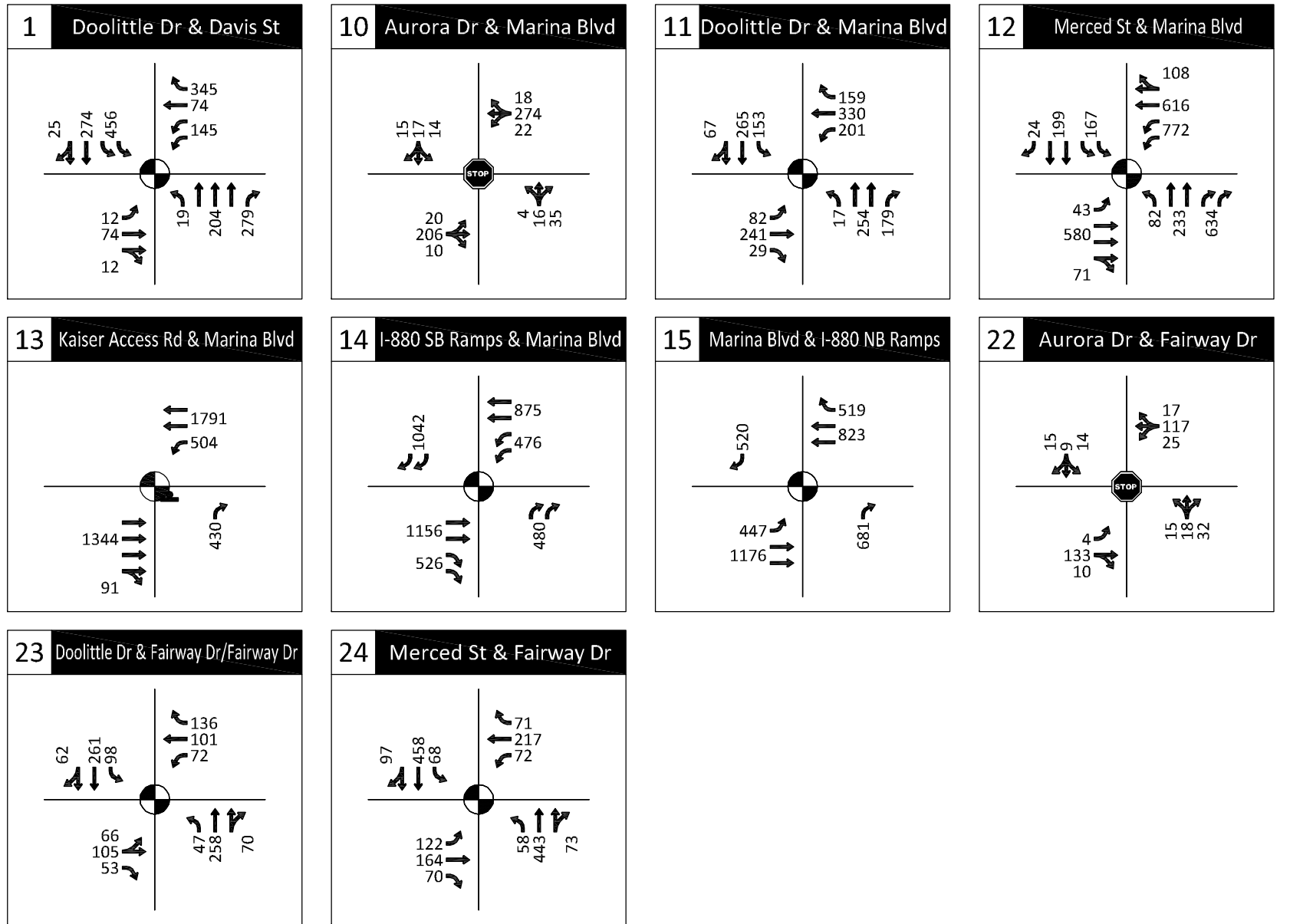
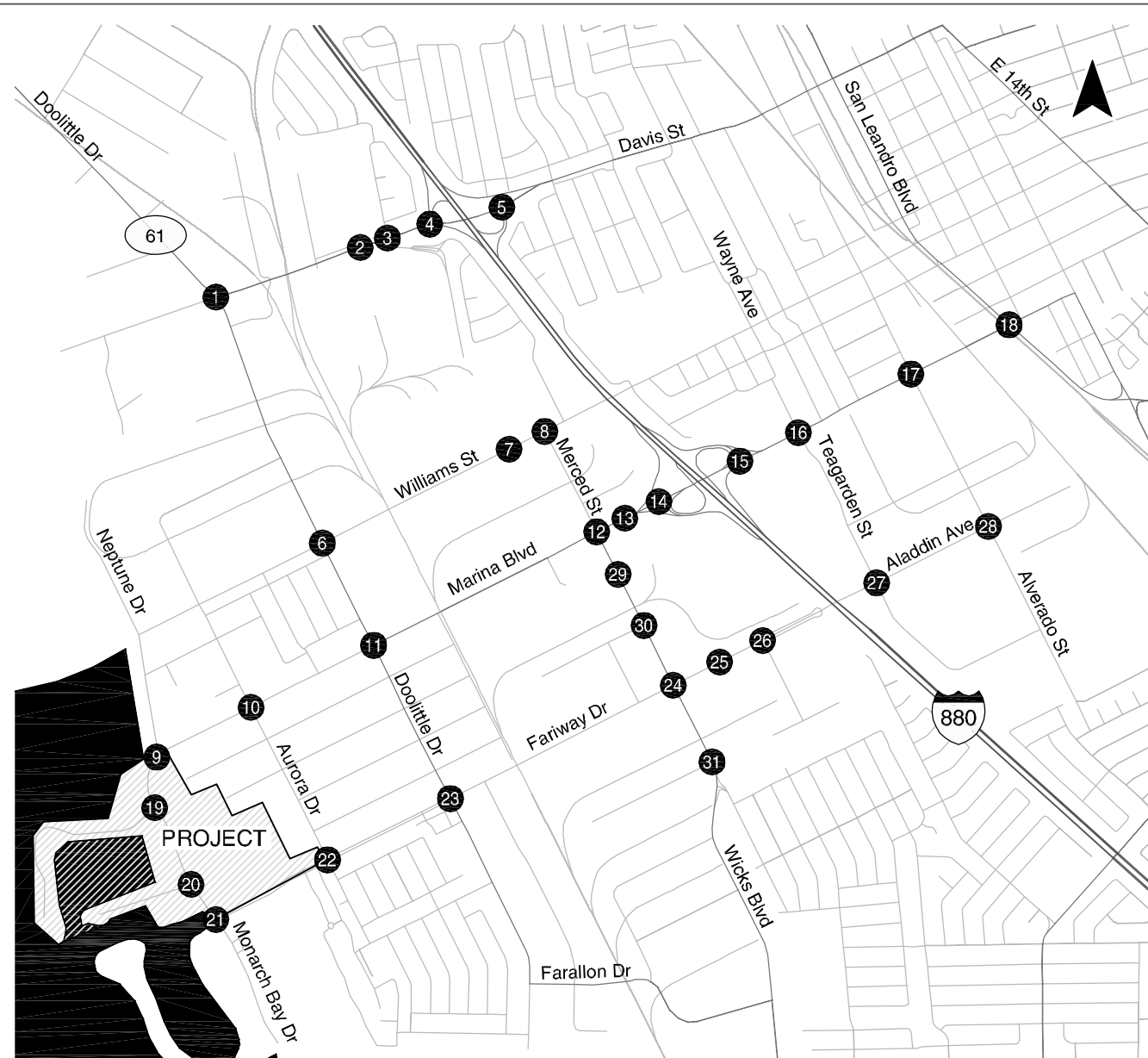
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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

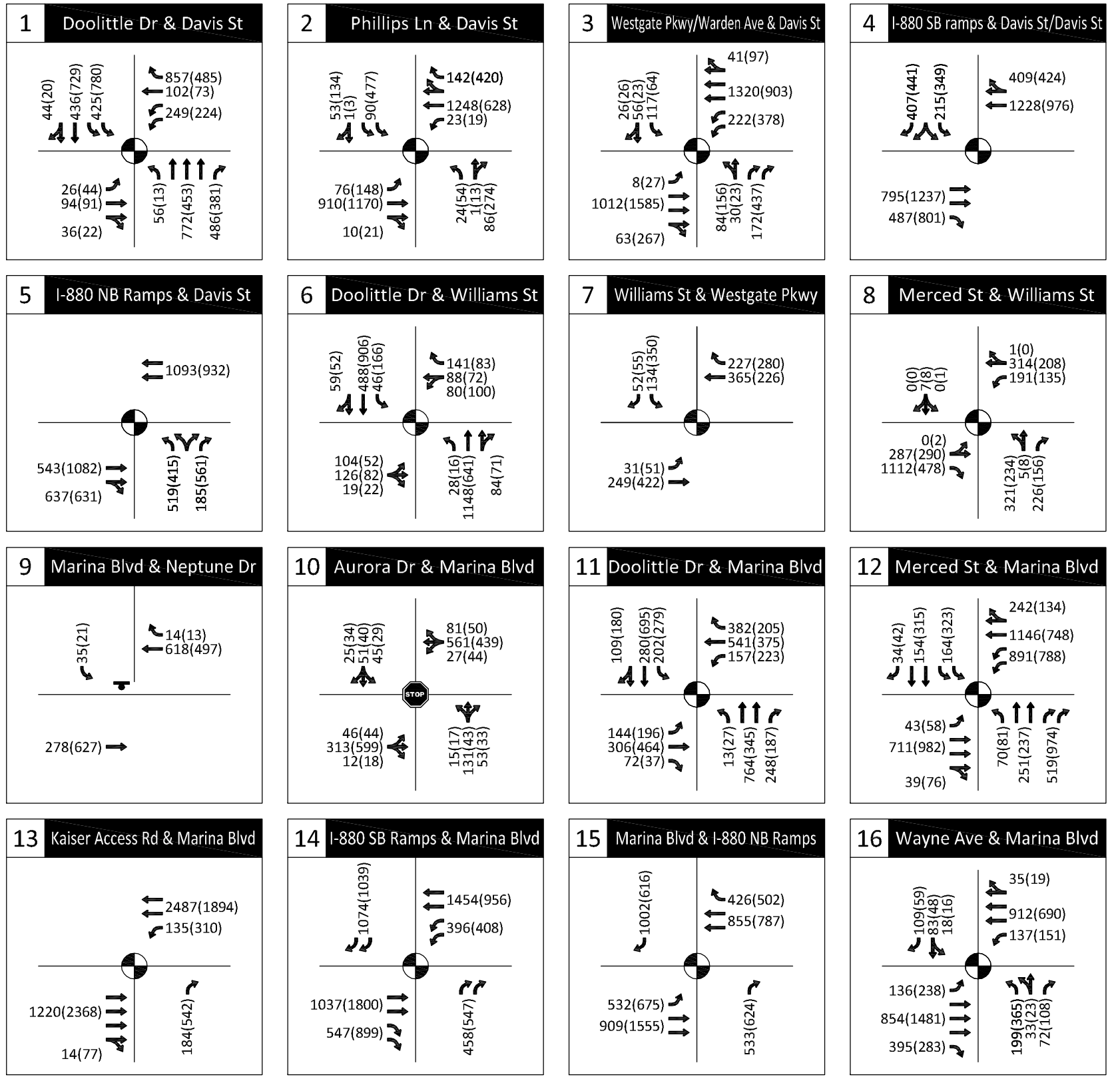
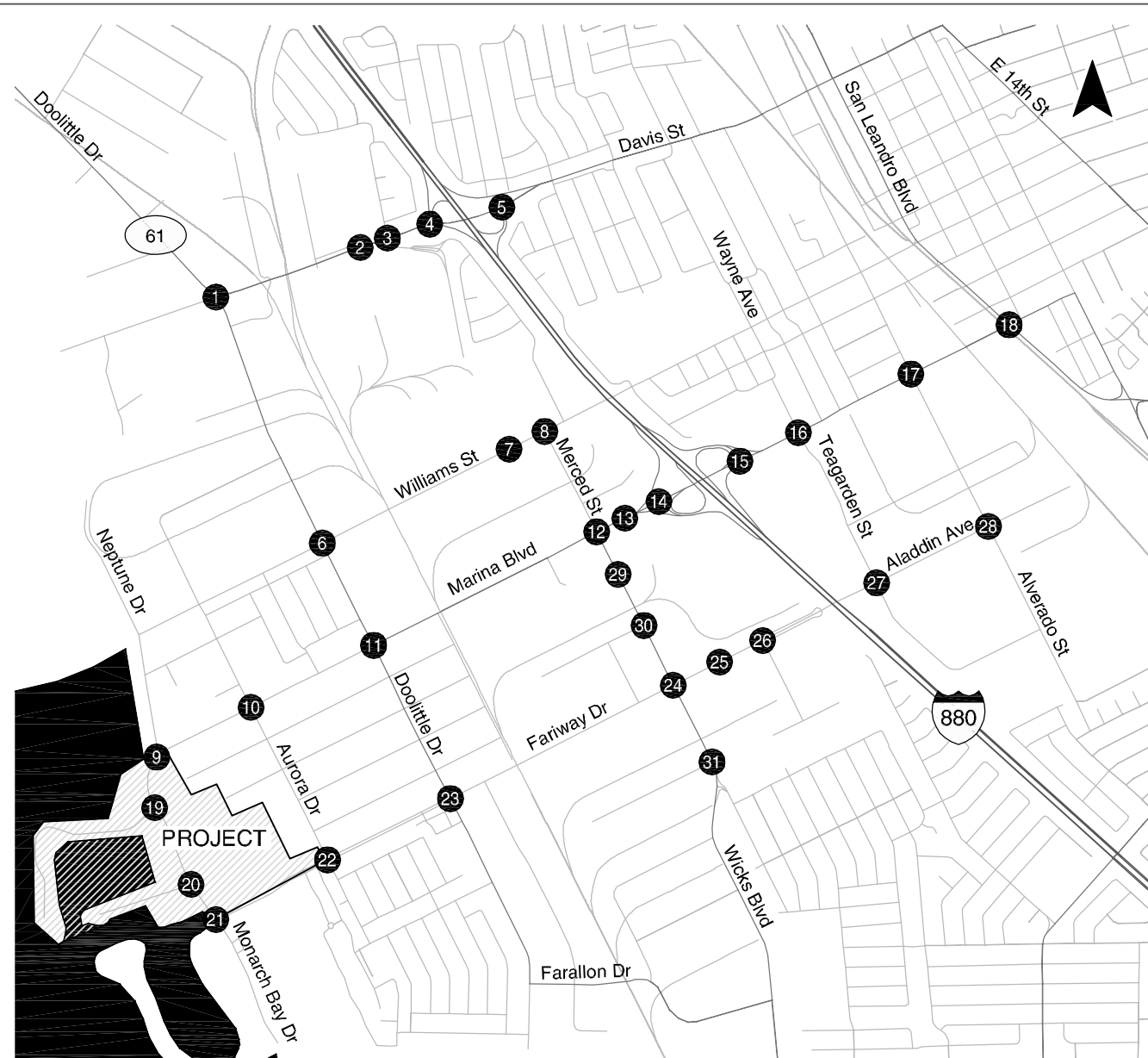
Near-Term Cumulative
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

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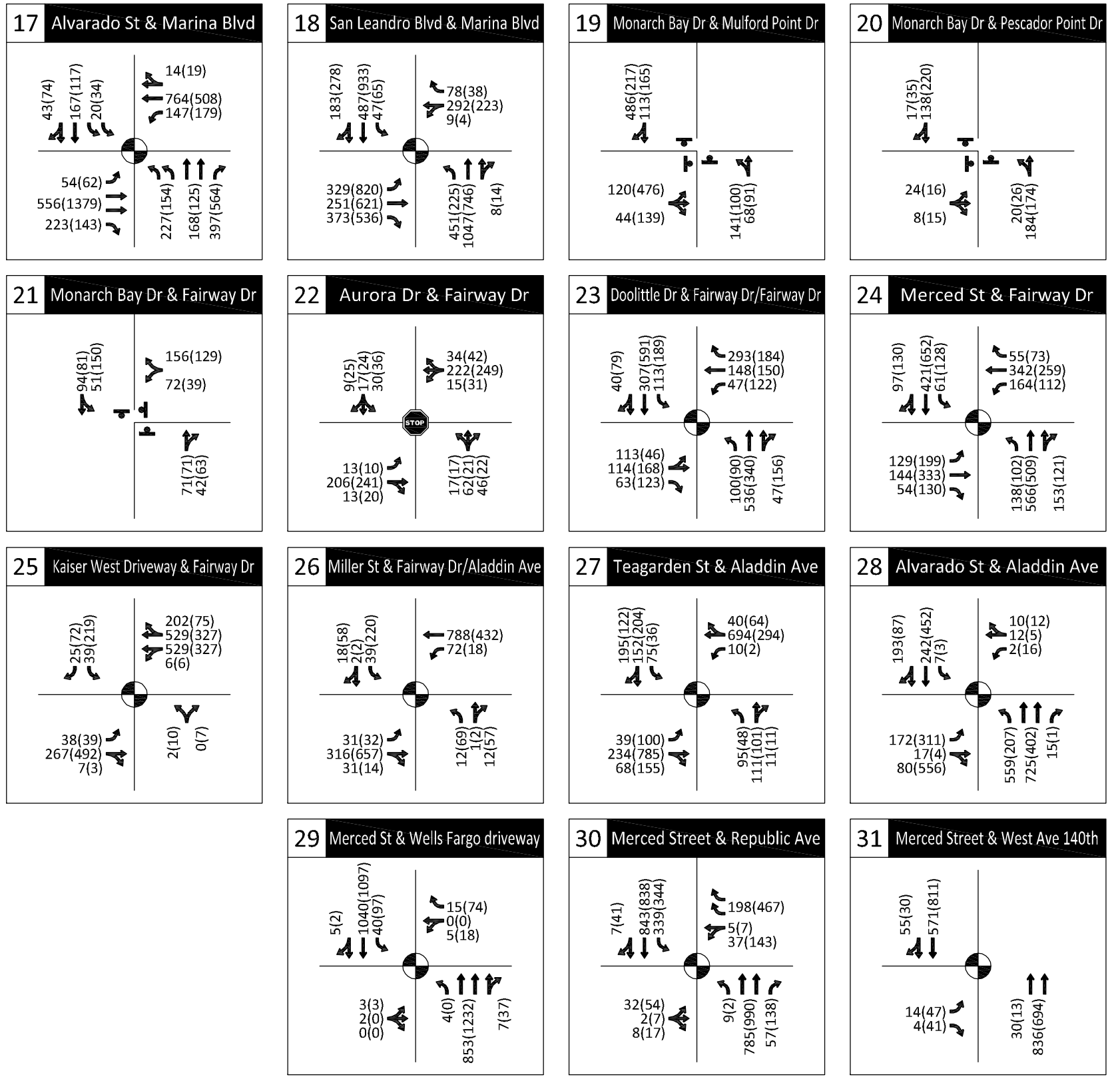
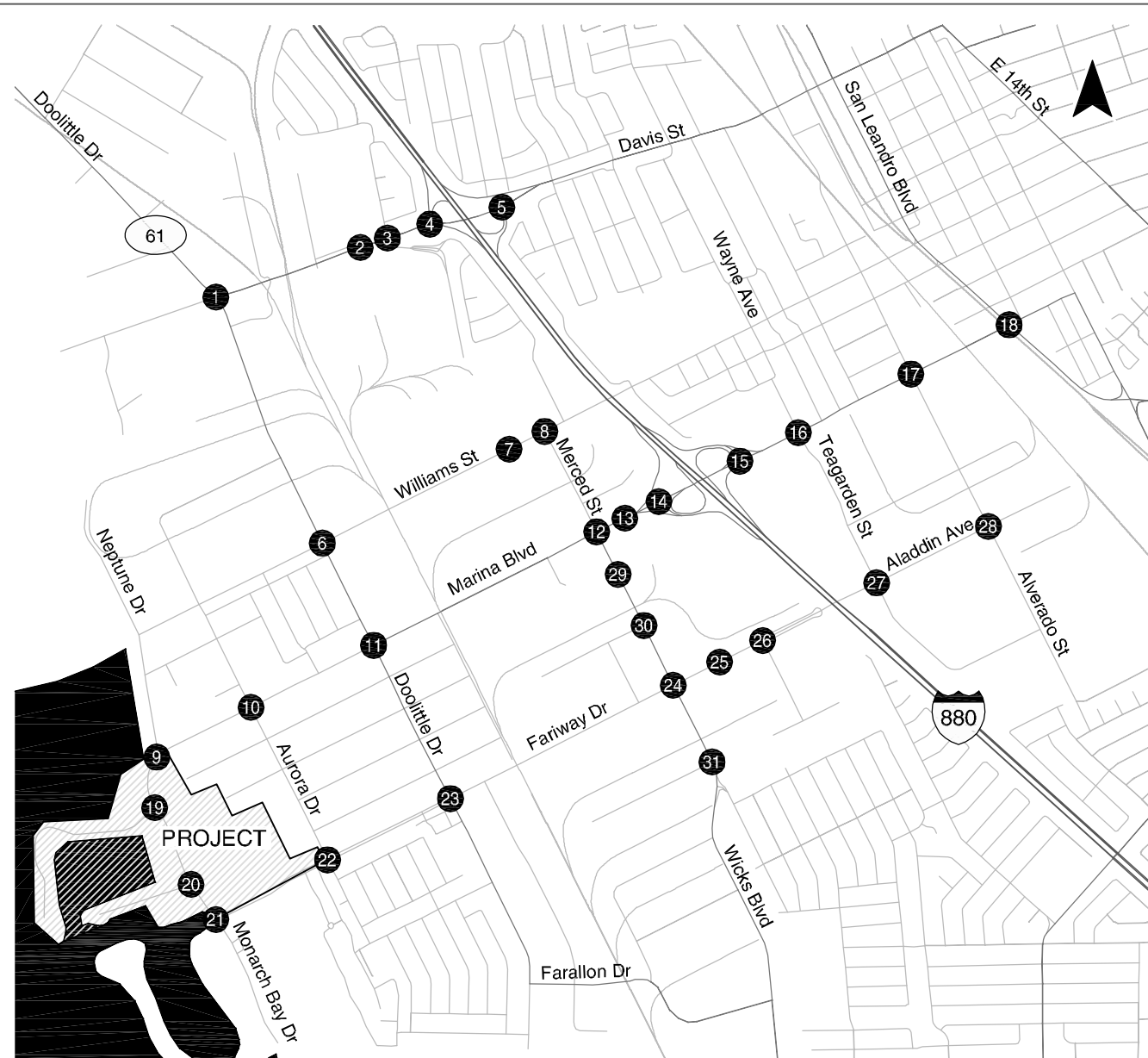
AM(PM) - Traffic Volume
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 - Traffic Signal

Near-Term Cumulative
 Saturday Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

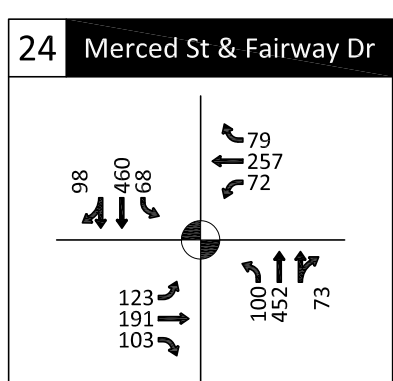
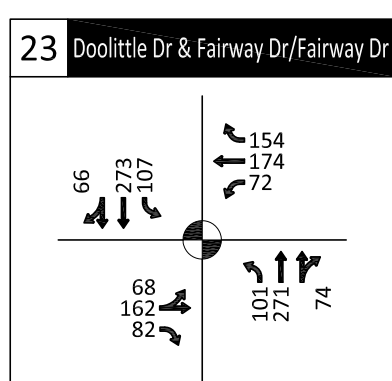
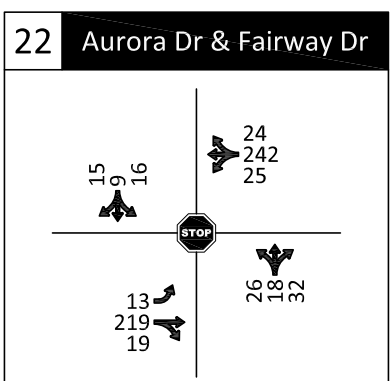
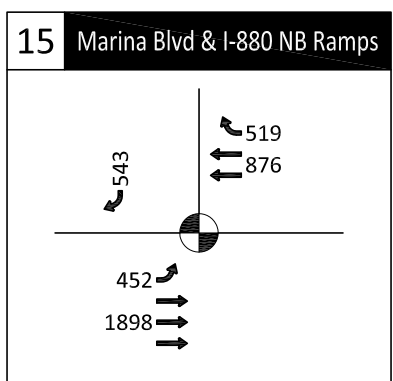
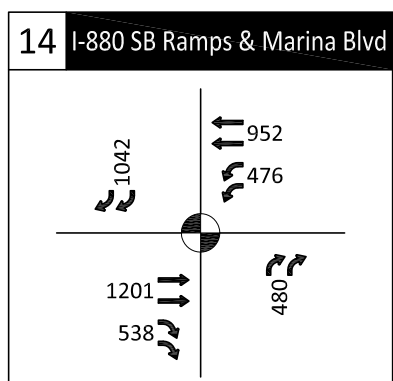
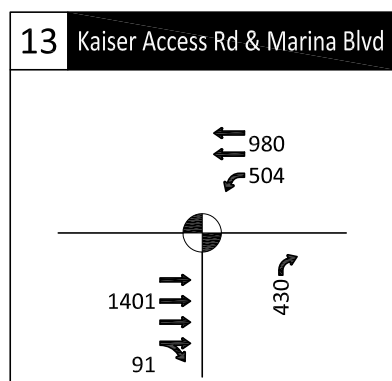
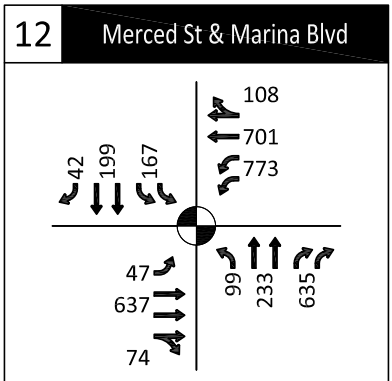
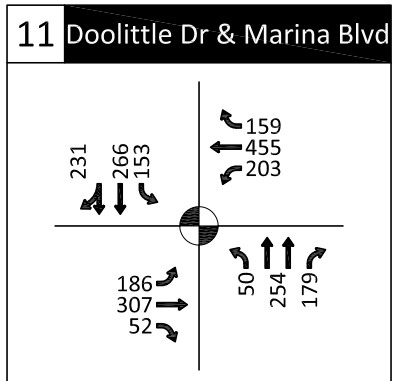
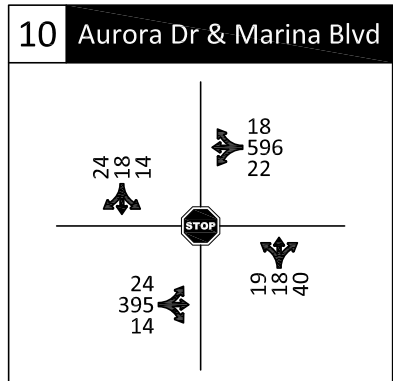
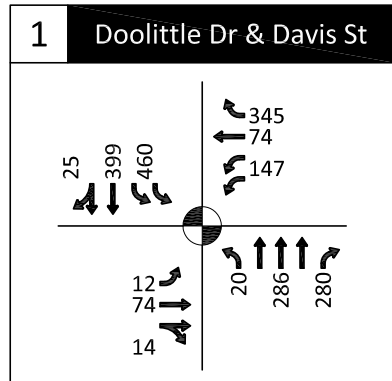
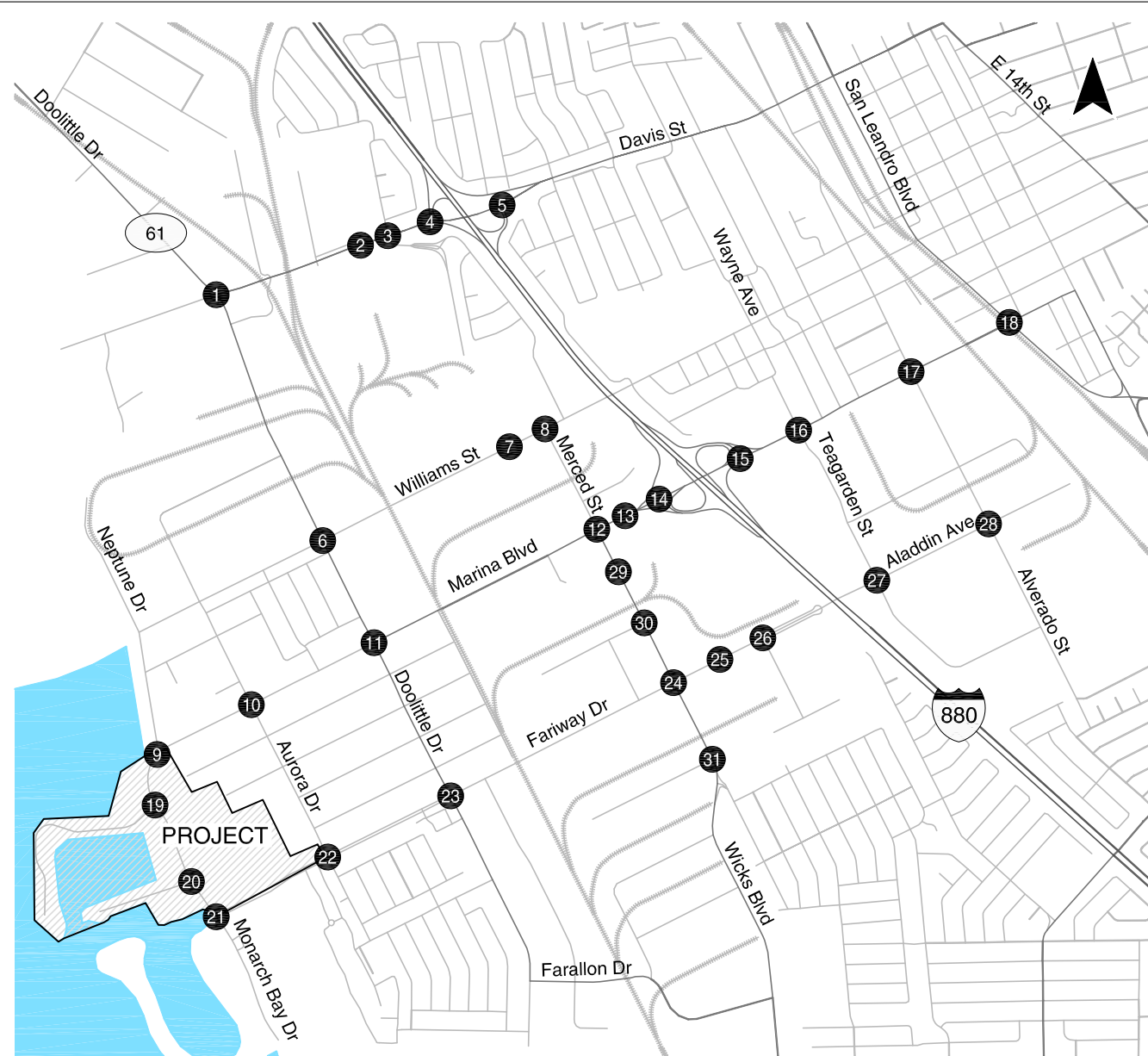
Near-Term Cumulative Plus Project
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Near-Term Cumulative Plus Project
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

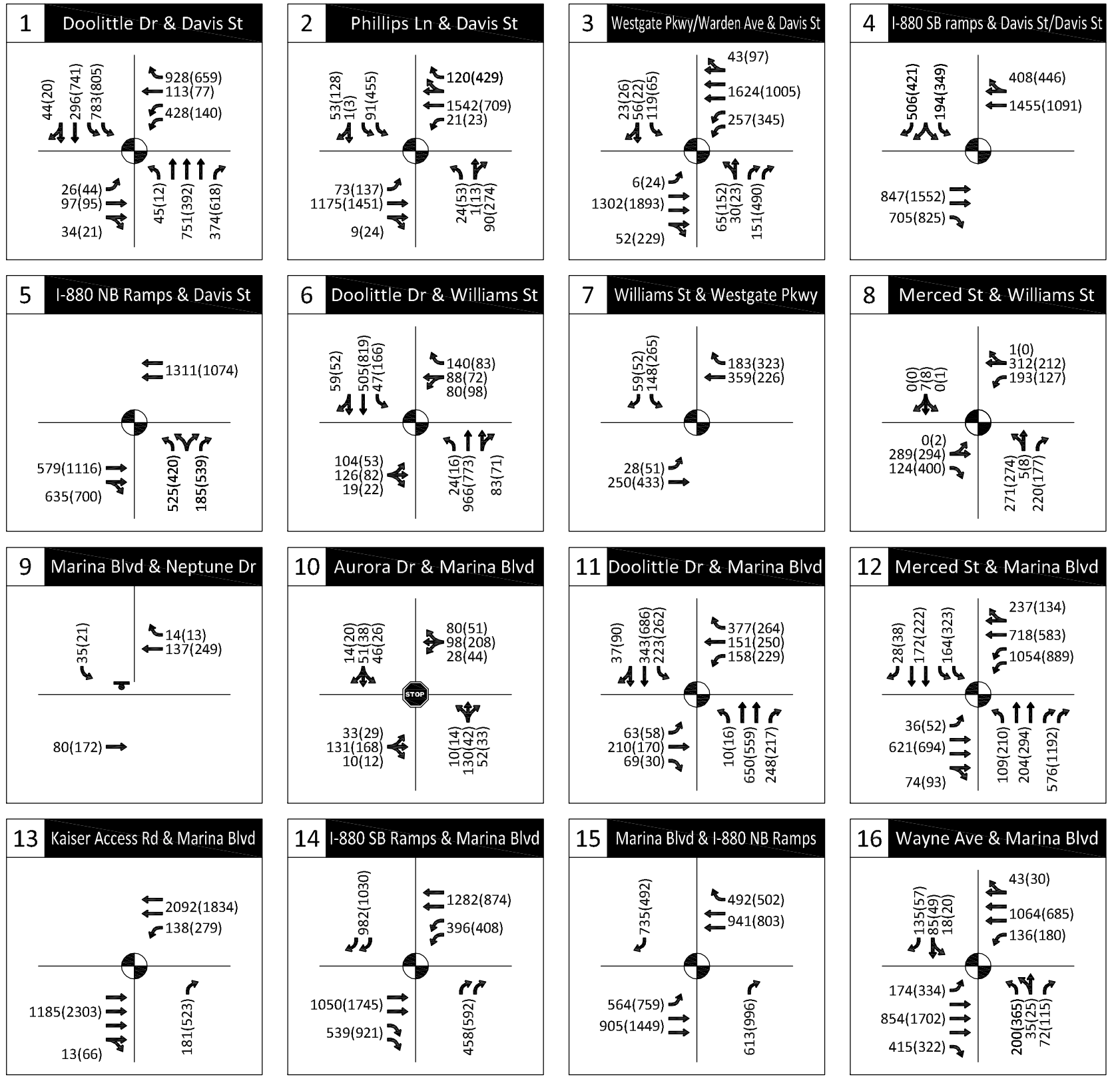
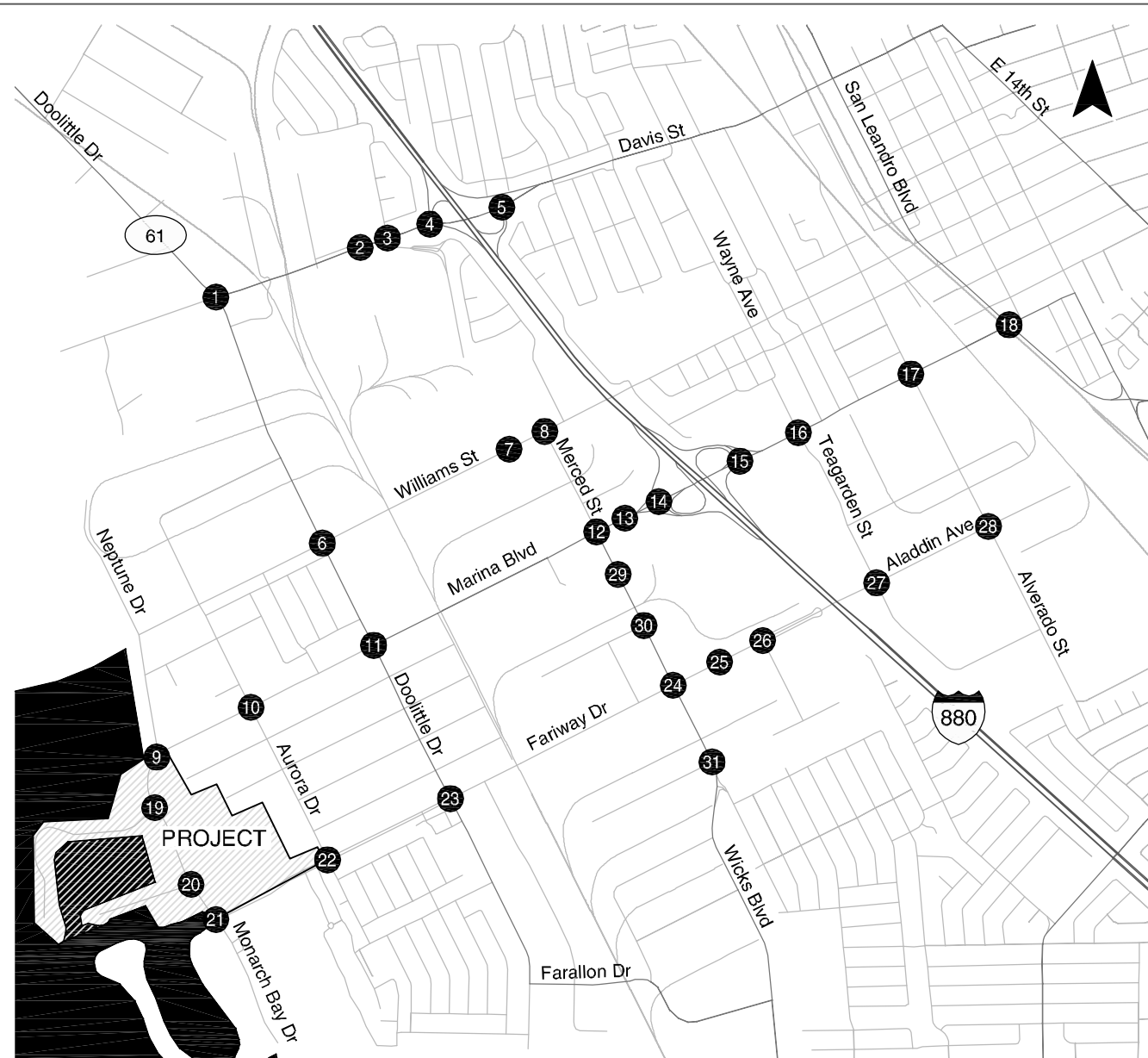
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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

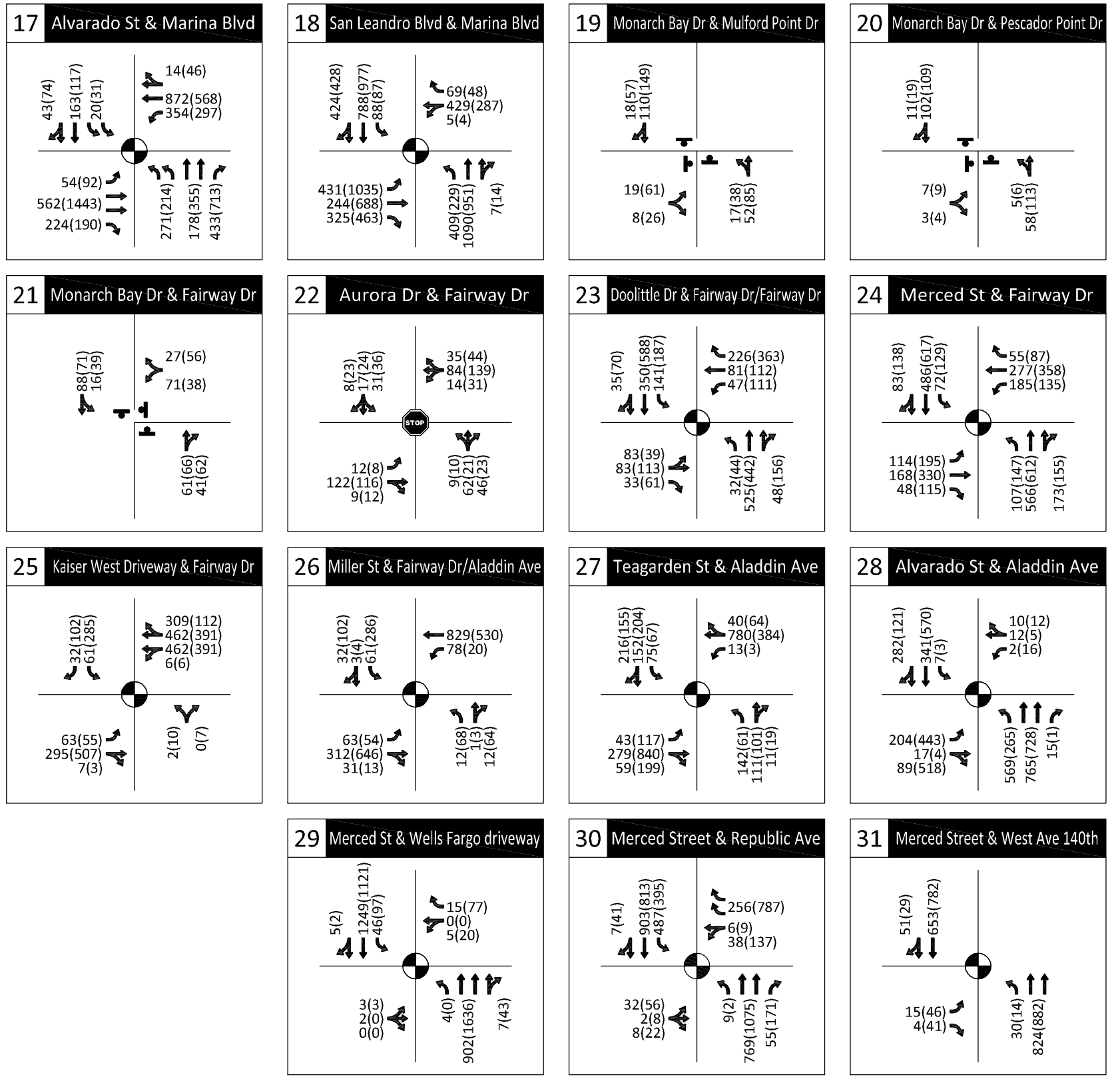
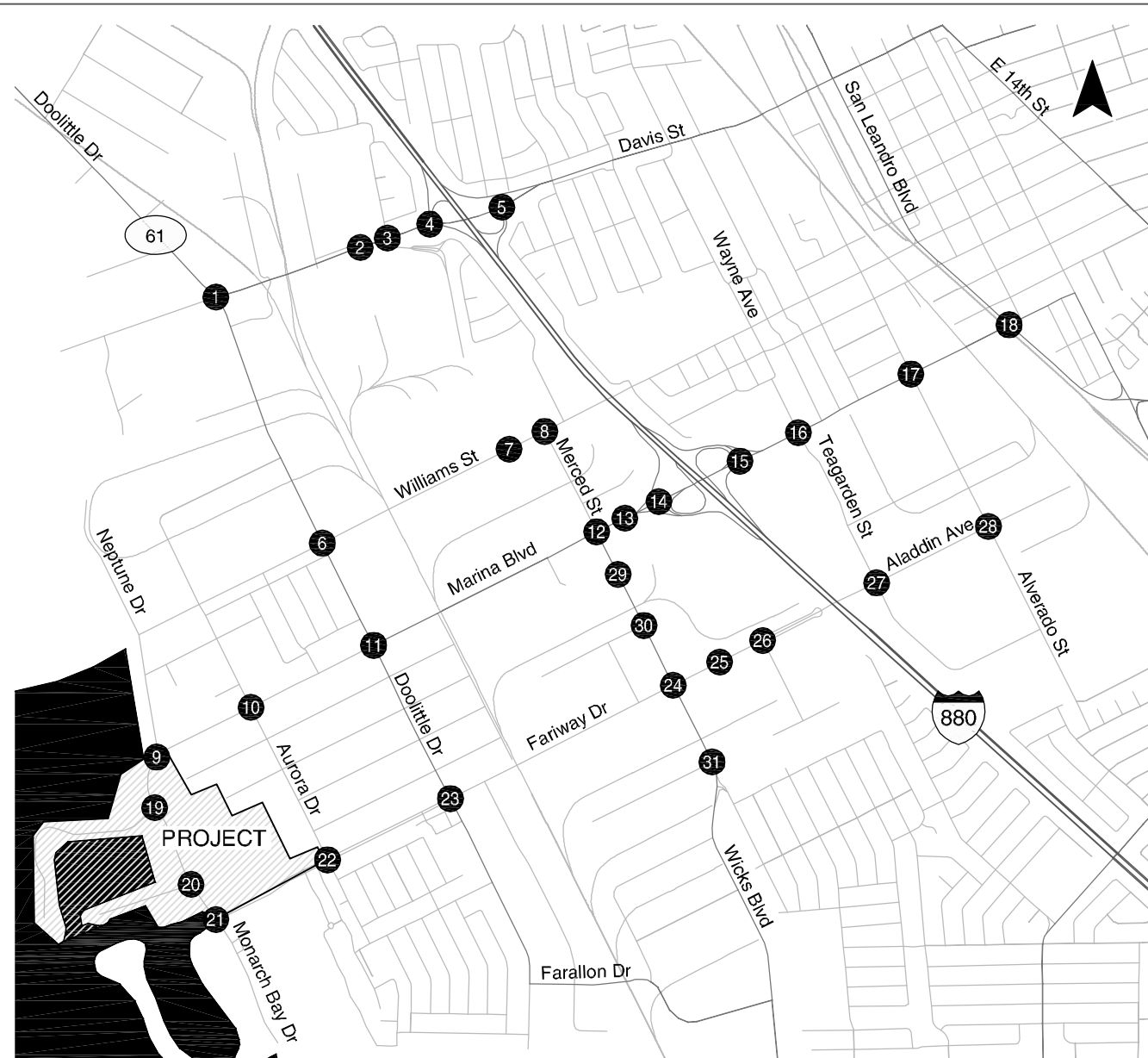
Near-Term Cumulative Plus Project
 Saturday Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Long-Term Cumulative
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

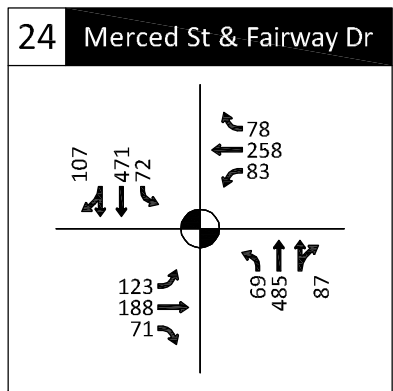
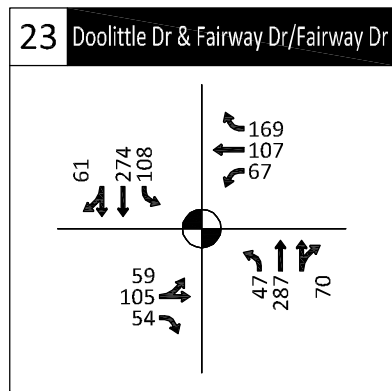
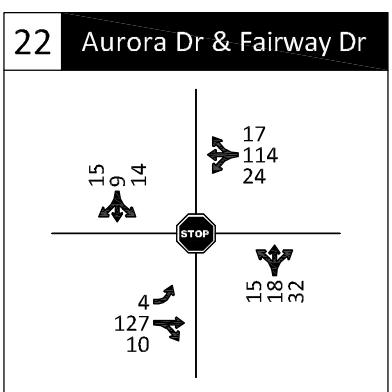
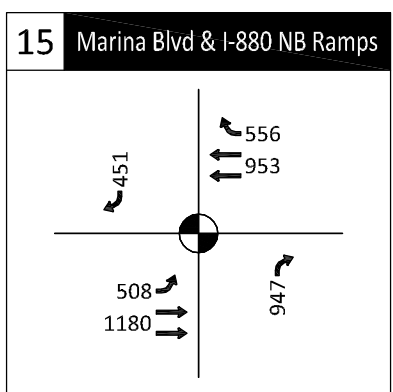
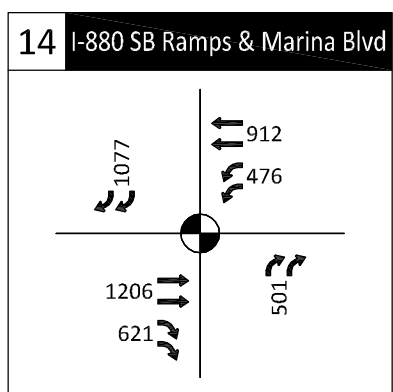
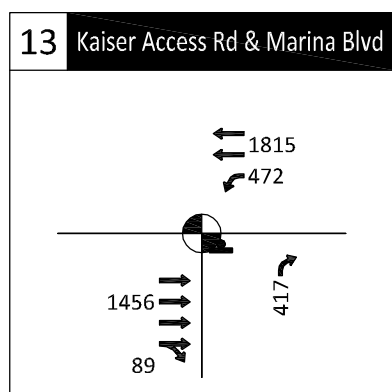
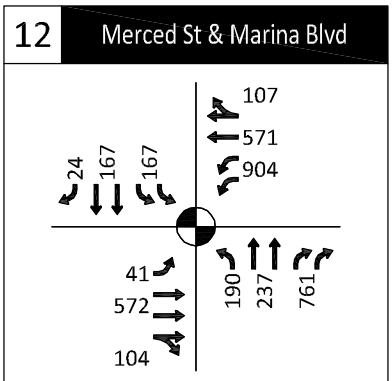
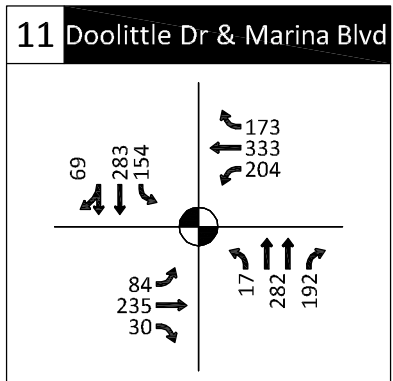
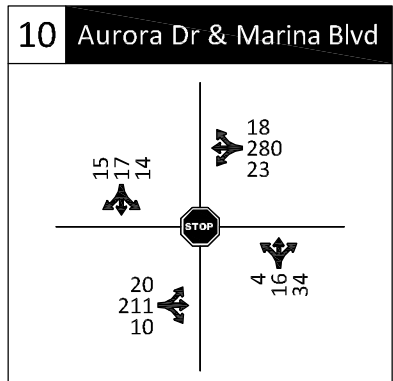
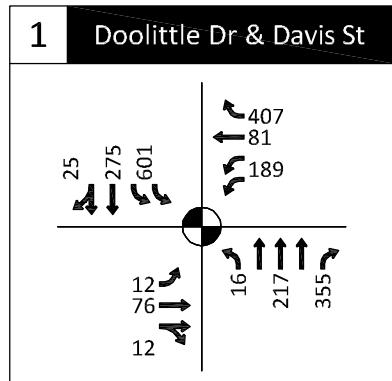
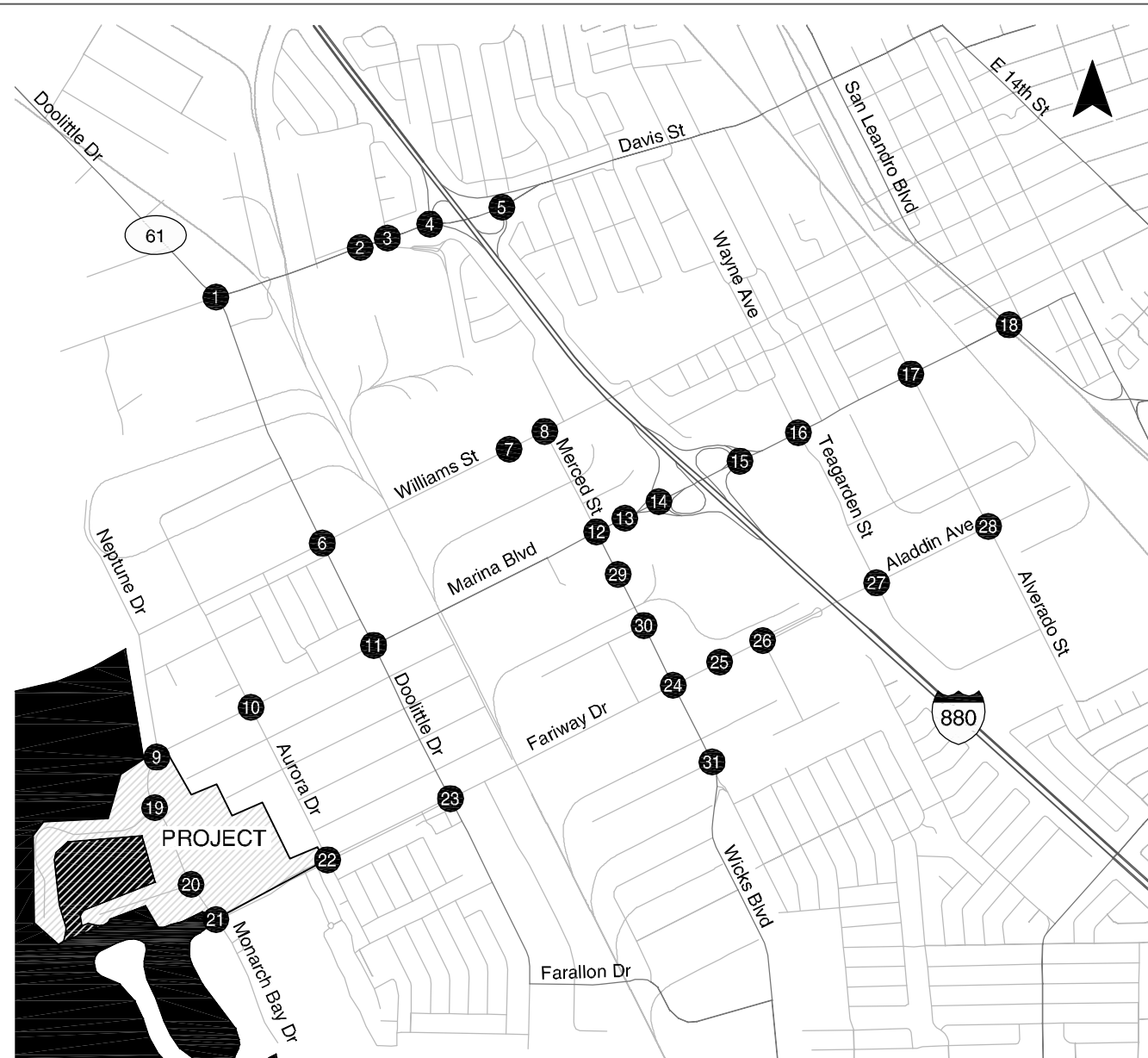
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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Long-Term Cumulative
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

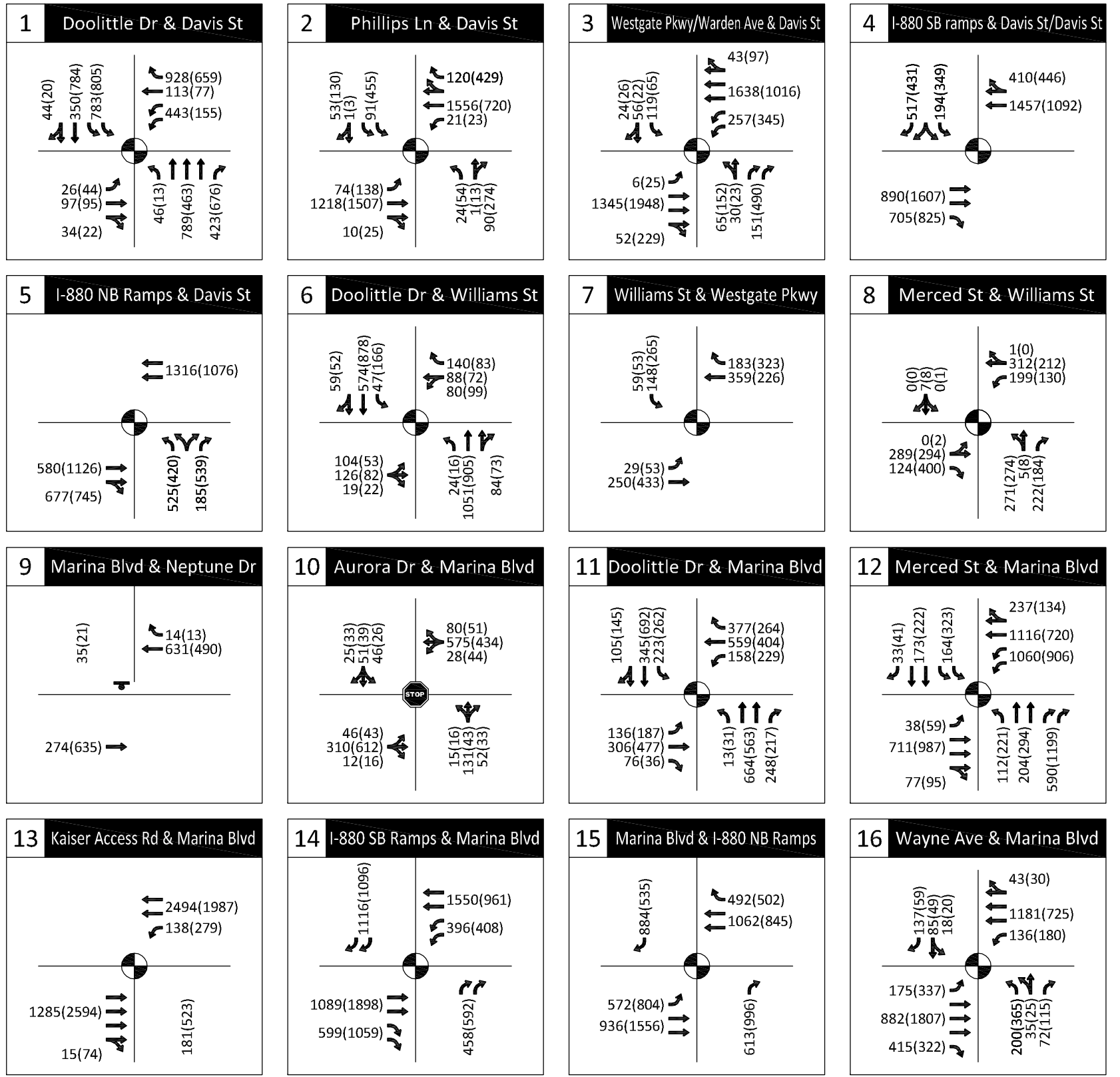
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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

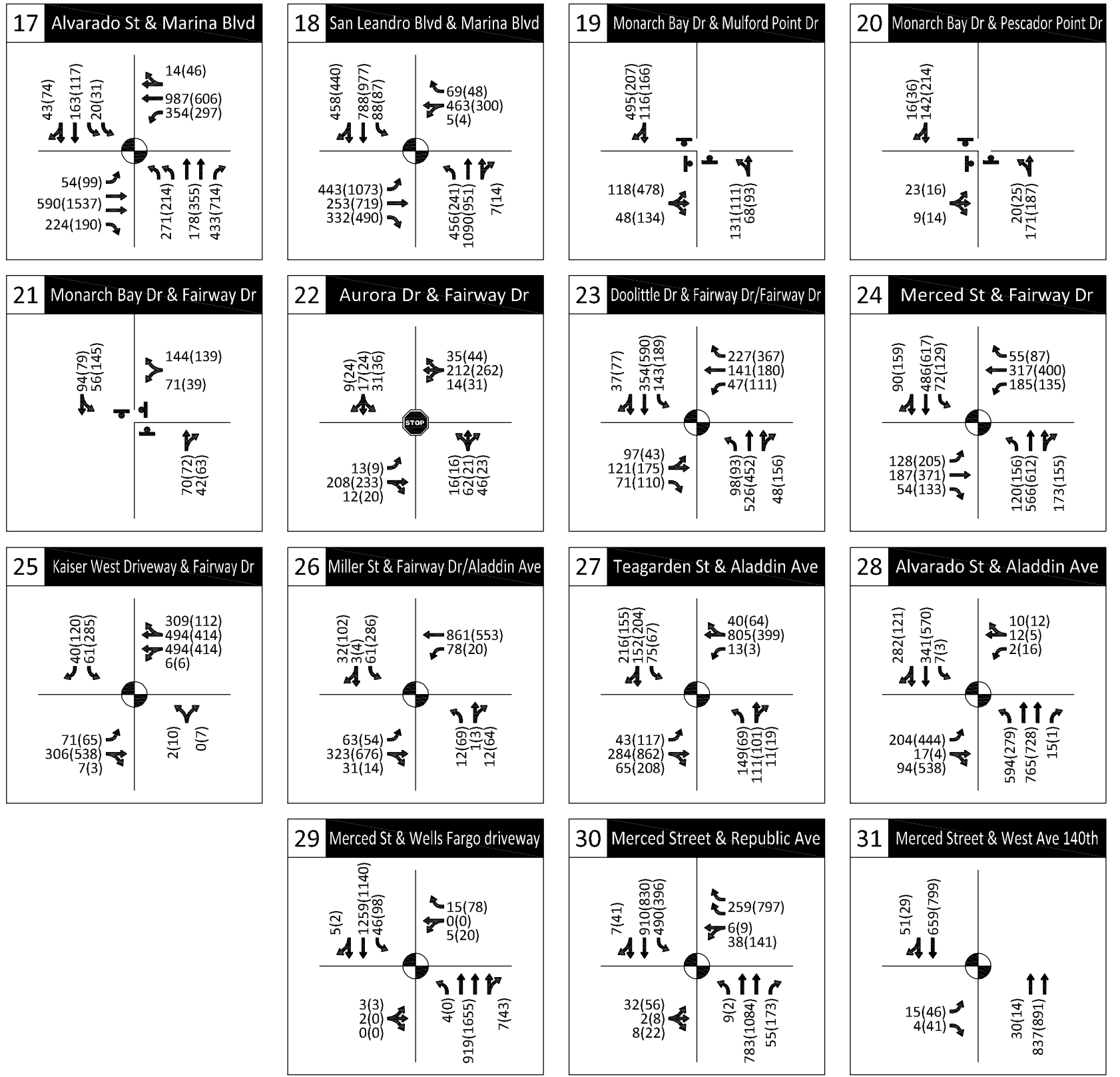
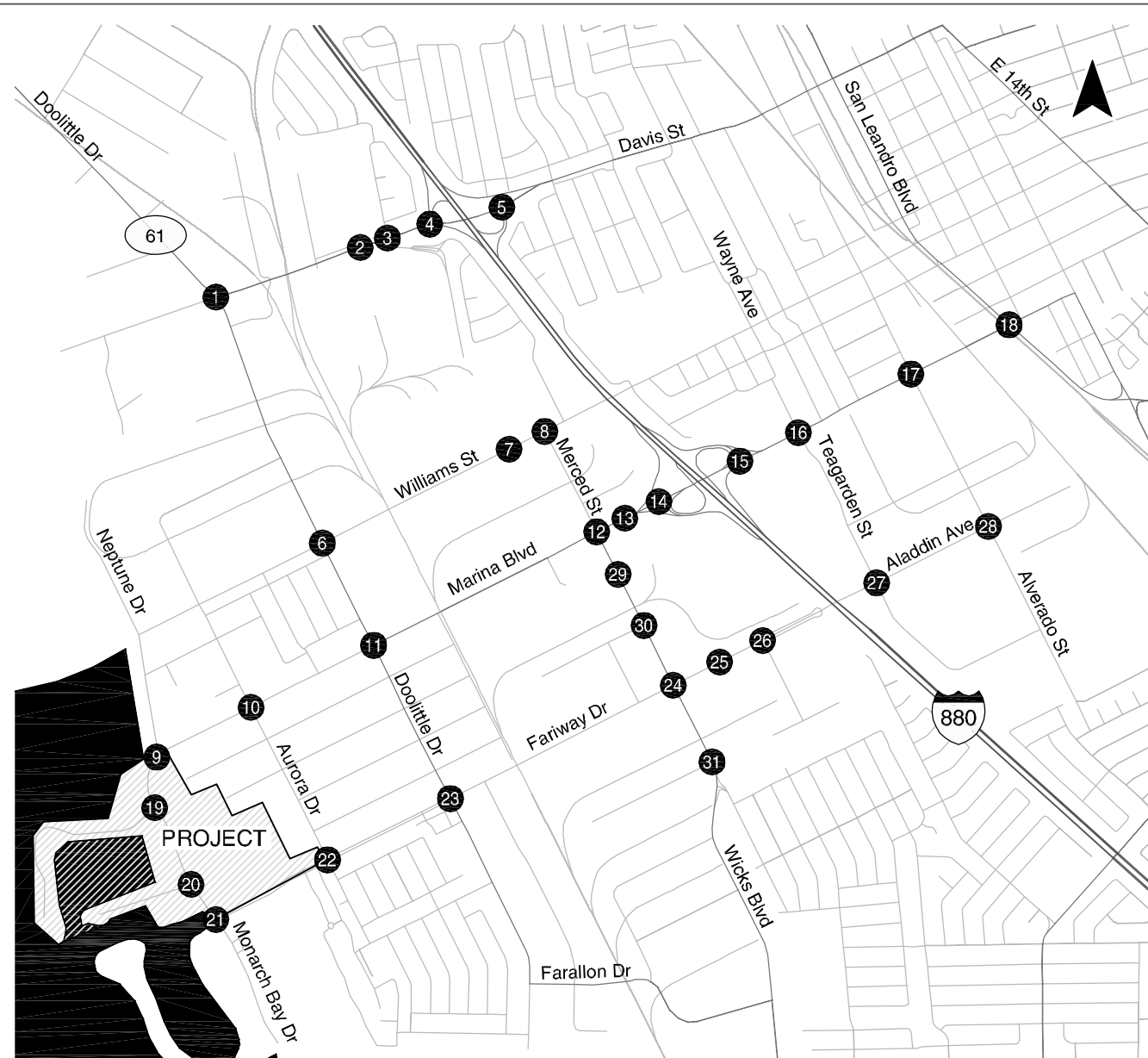
Long-Term Cumulative
 Saturday Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California



AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Long-Term Cumulative Plus Project
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

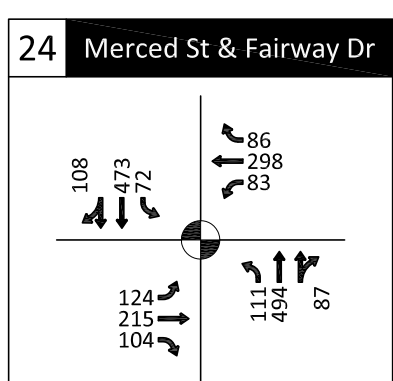
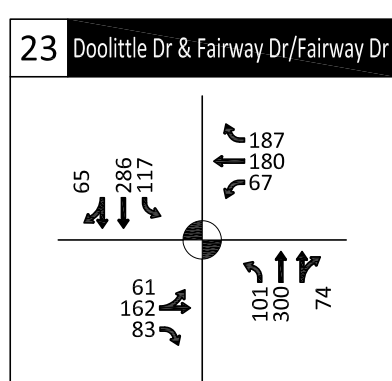
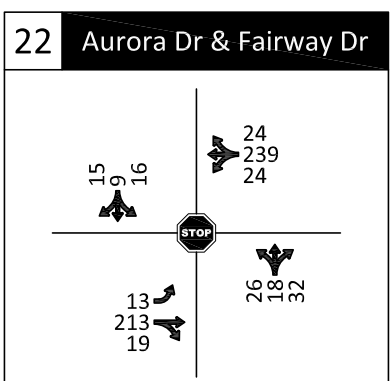
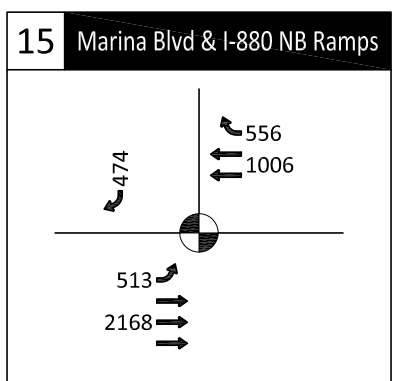
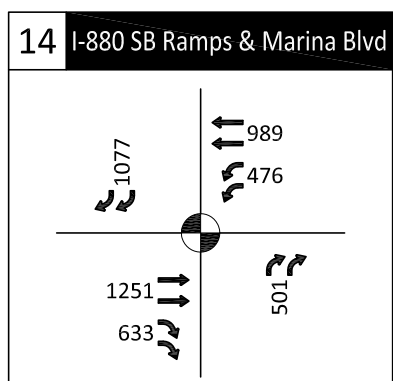
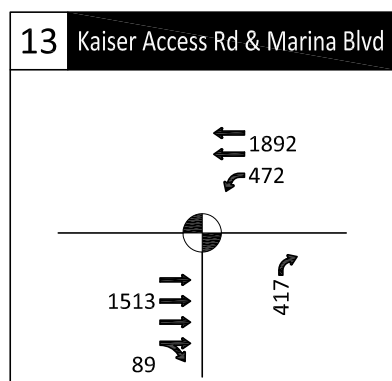
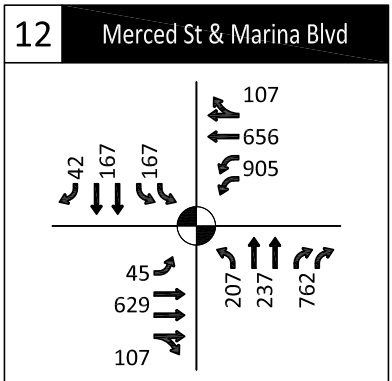
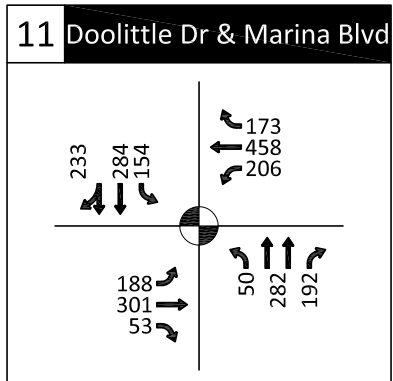
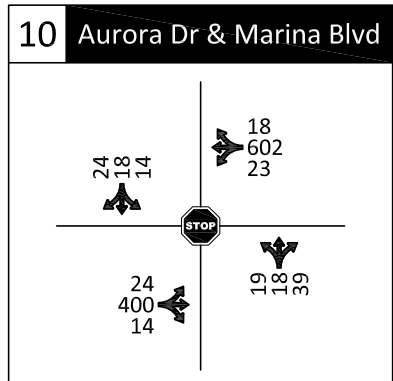
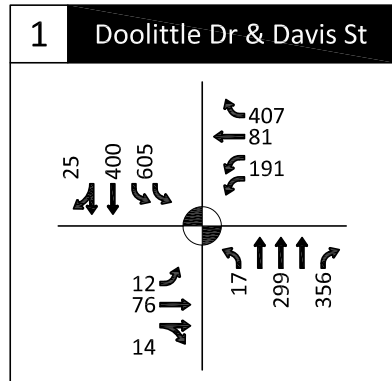
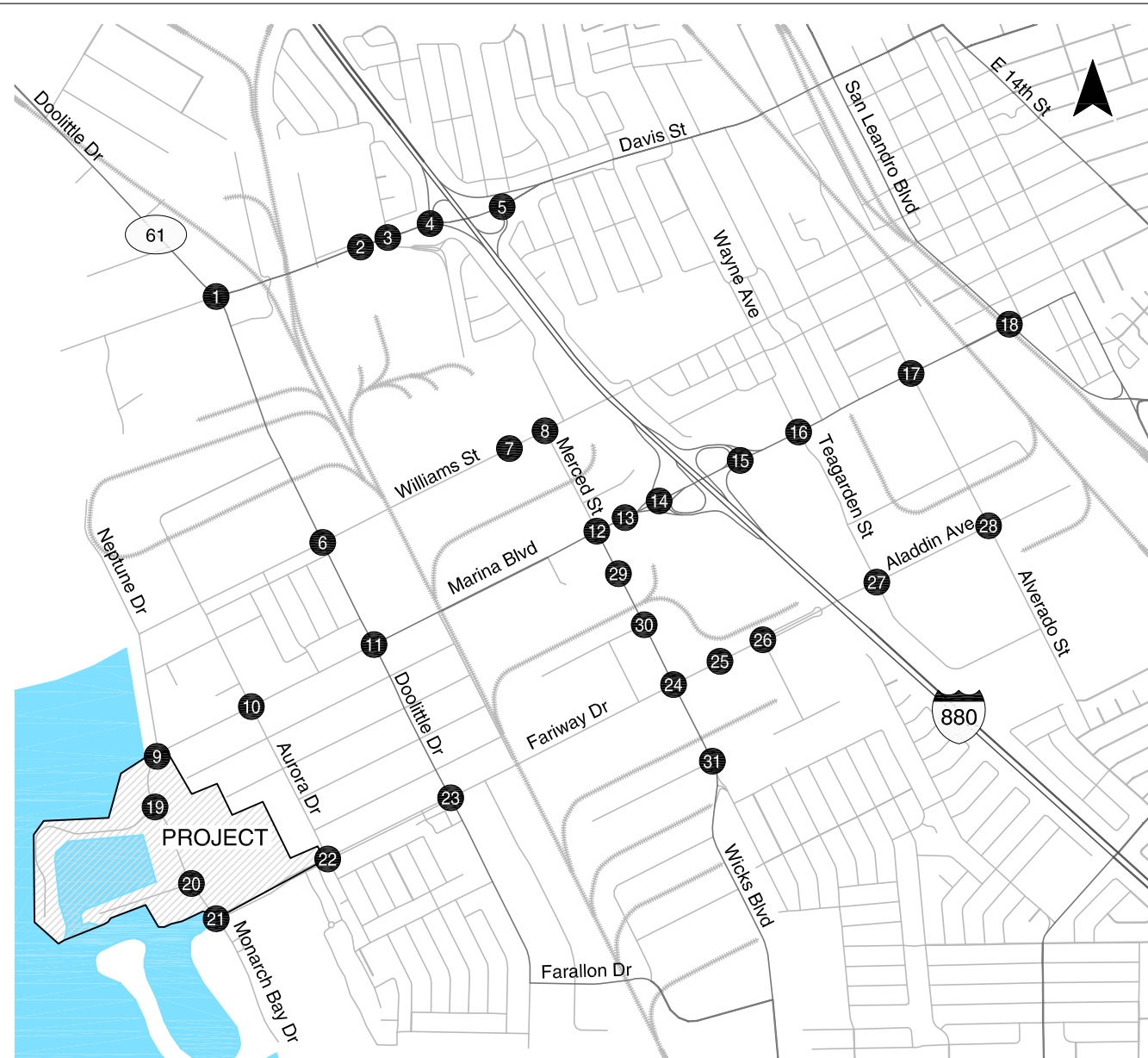
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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Long-Term Cumulative Plus Project
 Week Day Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California

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AM(PM) - Traffic Volume
 - All-Way Stop
 - Stop Sign
 - Traffic Signal

Long-Term Cumulative Plus Project
 Saturday Peak Hour Intersection Traffic Volumes and Lane Configurations
 San Leandro, California





























Appendix 4 Intersection Level of Service
Worksheets

Existing AM

HCM Signalized Intersection Capacity Analysis

Existing AM

1: Doolittle Dr & Davis St

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|--|---|--|---|---|---|---|---|--|--|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |   | |   |  |  |  |    |  |   |   | |
| Volume (vph) | 26 | 94 | 34 | 236 | 102 | 737 | 45 | 751 | 199 | 334 | 296 | 44 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3068 | | 3255 | 1689 | 1489 | 1620 | 4655 | 1434 | 3143 | 3165 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3068 | | 3255 | 1689 | 1489 | 1620 | 4655 | 1434 | 3143 | 3165 | |
| Peak-hour factor, PHF | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Adj. Flow (vph) | 27 | 98 | 35 | 246 | 106 | 768 | 47 | 782 | 207 | 348 | 308 | 46 |
| RTOR Reduction (vph) | 0 | 29 | 0 | 0 | 0 | 190 | 0 | 0 | 118 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 27 | 104 | 0 | 246 | 106 | 578 | 47 | 782 | 89 | 348 | 345 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 2.4 | 13.9 | | 10.7 | 22.2 | 38.6 | 14.4 | 23.8 | 34.5 | 16.4 | 25.8 | |
| Effective Green, g (s) | 2.4 | 13.9 | | 10.7 | 22.2 | 38.6 | 14.4 | 23.8 | 34.5 | 16.4 | 25.8 | |
| Actuated g/C Ratio | 0.03 | 0.17 | | 0.13 | 0.28 | 0.48 | 0.18 | 0.30 | 0.43 | 0.20 | 0.32 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 50 | 532 | | 434 | 468 | 717 | 291 | 1383 | 617 | 643 | 1019 | |
| v/s Ratio Prot | 0.02 | 0.03 | | c0.08 | 0.06 | c0.16 | 0.03 | c0.17 | 0.02 | 0.11 | 0.11 | |
| v/s Ratio Perm | | | | | | 0.22 | | | 0.04 | | | |
| v/c Ratio | 0.54 | 0.20 | | 0.57 | 0.23 | 0.81 | 0.16 | 0.57 | 0.14 | 0.54 | 0.34 | |
| Uniform Delay, d1 | 38.3 | 28.3 | | 32.5 | 22.3 | 17.6 | 27.8 | 23.8 | 13.8 | 28.5 | 20.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.2 | 0.2 | | 1.0 | 0.2 | 6.2 | 0.1 | 0.6 | 0.0 | 0.5 | 0.3 | |
| Delay (s) | 44.5 | 28.5 | | 33.5 | 22.6 | 23.8 | 27.8 | 24.4 | 13.9 | 29.0 | 21.0 | |
| Level of Service | D | C | | C | C | C | C | C | B | C | C | |
| Approach Delay (s) | | 31.2 | | | 25.8 | | | 22.5 | | | 25.0 | |
| Approach LOS | | C | | | C | | | C | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 24.8 | HCM 2000 Level of Service | | | | C | | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.72 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 80.1 | Sum of lost time (s) | | | | 15.3 | | | | |
| Intersection Capacity Utilization | | | 75.2% | ICU Level of Service | | | | D | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

Existing AM

2: Phillips Ln & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|-------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 73 | 531 | 9 | 20 | 1116 | 120 | 24 | 0 | 85 | 85 | 1 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3170 | | 1620 | 3069 | 1323 | 1678 | 1429 | | 3143 | 1395 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.32 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3170 | | 1620 | 3069 | 1323 | 570 | 1429 | | 3143 | 1395 | |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 81 | 590 | 10 | 22 | 1240 | 133 | 27 | 0 | 94 | 94 | 1 | 59 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 0 | 40 | 0 | 83 | 0 | 0 | 51 | 0 |
| Lane Group Flow (vph) | 81 | 599 | 0 | 22 | 1253 | 80 | 27 | 11 | 0 | 94 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 9.6 | 61.6 | | 4.2 | 56.2 | 70.0 | 12.4 | 12.4 | | 13.8 | 13.8 | |
| Effective Green, g (s) | 9.6 | 61.6 | | 4.2 | 56.2 | 70.0 | 12.4 | 12.4 | | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.09 | 0.59 | | 0.04 | 0.54 | 0.67 | 0.12 | 0.12 | | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 148 | 1859 | | 64 | 1642 | 882 | 67 | 168 | | 413 | 183 | |
| v/s Ratio Prot | c0.05 | 0.19 | | 0.01 | c0.41 | 0.01 | | 0.01 | | c0.03 | | |
| v/s Ratio Perm | | | | | | 0.05 | c0.05 | | | | | 0.01 |
| v/c Ratio | 0.55 | 0.32 | | 0.34 | 0.76 | 0.09 | 0.40 | 0.07 | | 0.23 | 0.05 | |
| Uniform Delay, d1 | 45.6 | 11.1 | | 49.1 | 19.2 | 6.2 | 42.9 | 41.2 | | 40.8 | 39.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.15 | 0.89 | 1.09 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 0.5 | | 1.0 | 2.8 | 0.0 | 1.4 | 0.1 | | 0.3 | 0.1 | |
| Delay (s) | 47.8 | 11.5 | | 57.3 | 19.8 | 6.8 | 44.3 | 41.2 | | 41.1 | 40.0 | |
| Level of Service | D | B | | E | B | A | D | D | | D | D | |
| Approach Delay (s) | | 15.8 | | | 19.3 | | | 41.9 | | | 40.7 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 20.9 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.61 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 65.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↵ | ↑↑↑ | | ↵↵ | ↑↑ | | | ↑ | ↵↵ | ↵ | ↑ | |
| Volume (vph) | 6 | 644 | 50 | 222 | 1180 | 41 | 65 | 30 | 150 | 117 | 56 | 23 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.97 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4519 | | 3143 | 3305 | | | 1825 | 2807 | 1562 | 1555 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.75 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4519 | | 3143 | 3305 | | | 1419 | 2807 | 1562 | 1555 | |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 6 | 685 | 53 | 236 | 1255 | 44 | 69 | 32 | 160 | 124 | 60 | 24 |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 2 | 0 | 0 | 0 | 119 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 6 | 731 | 0 | 236 | 1297 | 0 | 0 | 101 | 41 | 124 | 70 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 1.0 | 51.0 | | 13.8 | 64.3 | | | 12.9 | 26.7 | 13.8 | 13.8 | |
| Effective Green, g (s) | 1.0 | 51.0 | | 13.8 | 64.3 | | | 12.9 | 26.7 | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.01 | 0.49 | | 0.13 | 0.61 | | | 0.12 | 0.25 | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 15 | 2194 | | 413 | 2023 | | | 174 | 713 | 205 | 204 | |
| v/s Ratio Prot | c0.00 | 0.16 | | 0.08 | c0.39 | | | | 0.01 | c0.08 | 0.05 | |
| v/s Ratio Perm | | | | | | | | c0.07 | 0.01 | | | |
| v/c Ratio | 0.40 | 0.33 | | 0.57 | 0.64 | | | 0.58 | 0.06 | 0.60 | 0.34 | |
| Uniform Delay, d1 | 51.7 | 16.6 | | 42.8 | 13.0 | | | 43.5 | 29.6 | 43.0 | 41.5 | |
| Progression Factor | 0.79 | 0.64 | | 1.17 | 0.71 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.1 | 0.4 | | 1.0 | 1.3 | | | 3.2 | 0.0 | 3.4 | 0.4 | |
| Delay (s) | 46.9 | 11.0 | | 51.1 | 10.4 | | | 46.6 | 29.6 | 46.5 | 41.8 | |
| Level of Service | D | B | | D | B | | | D | C | D | D | |
| Approach Delay (s) | | 11.3 | | | 16.7 | | | 36.2 | | | 44.6 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.63 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 68.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: I-880 SB ramps & Davis St/Davis Street

Existing AM

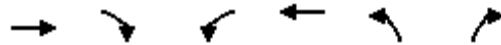


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|--------|------|---------------------------|------|------|------|------|-------|------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 531 | 372 | 0 | 1106 | 378 | 0 | 0 | 0 | 194 | 0 | 366 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.96 | | | | | 1.00 | 0.86 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3109 | | | | | 1681 | 1421 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3109 | | | | | 1681 | 1421 | 1461 |
| Peak-hour factor, PHF | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Adj. Flow (vph) | 0 | 553 | 388 | 0 | 1152 | 394 | 0 | 0 | 0 | 202 | 0 | 381 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 57 | 57 |
| Lane Group Flow (vph) | 0 | 553 | 388 | 0 | 1526 | 0 | 0 | 0 | 0 | 182 | 146 | 141 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 75.8 | 105.0 | | 75.8 | | | | | 21.2 | 21.2 | 21.2 |
| Effective Green, g (s) | | 75.8 | 105.0 | | 75.8 | | | | | 21.2 | 21.2 | 21.2 |
| Actuated g/C Ratio | | 0.72 | 1.00 | | 0.72 | | | | | 0.20 | 0.20 | 0.20 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2376 | 1439 | | 2244 | | | | | 339 | 286 | 294 |
| v/s Ratio Prot | | 0.17 | | | 0.49 | | | | | 0.11 | 0.10 | 0.10 |
| v/s Ratio Perm | | | 0.27 | | | | | | | | | |
| v/c Ratio | | 0.23 | 0.27 | | 0.68 | | | | | 0.54 | 0.51 | 0.48 |
| Uniform Delay, d1 | | 4.9 | 0.0 | | 8.0 | | | | | 37.5 | 37.3 | 37.0 |
| Progression Factor | | 0.71 | 1.00 | | 0.82 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.2 | 0.1 | | 1.6 | | | | | 1.6 | 1.5 | 1.2 |
| Delay (s) | | 3.7 | 0.1 | | 8.1 | | | | | 39.1 | 38.8 | 38.3 |
| Level of Service | | A | A | | A | | | | | D | D | D |
| Approach Delay (s) | | 2.2 | | | 8.1 | | | 0.0 | | | 38.7 | |
| Approach LOS | | A | | | A | | | A | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 12.1 | | HCM 2000 Level of Service | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.65 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | | | | | 8.0 | | |
| Intersection Capacity Utilization | | | 64.4% | | ICU Level of Service | | | | | C | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

Existing AM
























| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|-------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↑↑↑ | ↑ |
| Volume (vph) | 513 | 390 | 0 | 1065 | 399 | 185 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Frt | 0.94 | | | 1.00 | 0.99 | 0.85 |
| Flt Protected | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3310 | | | 3539 | 3426 | 1441 |
| Flt Permitted | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3310 | | | 3539 | 3426 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 558 | 424 | 0 | 1158 | 434 | 201 |
| RTOR Reduction (vph) | 76 | 0 | 0 | 0 | 4 | 149 |
| Lane Group Flow (vph) | 906 | 0 | 0 | 1158 | 450 | 32 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 79.6 | | | 79.6 | 18.4 | 18.4 |
| Effective Green, g (s) | 79.6 | | | 79.6 | 18.4 | 18.4 |
| Actuated g/C Ratio | 0.76 | | | 0.76 | 0.18 | 0.18 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2509 | | | 2682 | 600 | 252 |
| v/s Ratio Prot | 0.27 | | | c0.33 | c0.13 | 0.02 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.36 | | | 0.43 | 0.75 | 0.13 |
| Uniform Delay, d1 | 4.2 | | | 4.6 | 41.1 | 36.5 |
| Progression Factor | 1.09 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.4 | | | 0.5 | 4.5 | 0.1 |
| Delay (s) | 5.0 | | | 5.1 | 45.6 | 36.6 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 5.0 | | | 5.1 | 43.0 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 13.7 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.49 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 49.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
6: Doolittle Dr & Williams St

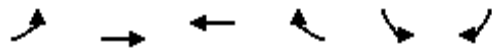
Existing AM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  |  | |
| Volume (vph) | 104 | 126 | 19 | 79 | 88 | 138 | 24 | 822 | 83 | 46 | 332 | 57 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | | |
| Flt Protected | | 0.98 | | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1533 | | | 1691 | 1304 | 1620 | 3029 | | 1562 | 2997 | | |
| Flt Permitted | | 0.79 | | | 0.75 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1231 | | | 1292 | 1304 | 1620 | 3029 | | 1562 | 2997 | | |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | |
| Adj. Flow (vph) | 114 | 138 | 21 | 87 | 97 | 152 | 26 | 903 | 91 | 51 | 365 | 63 | |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 106 | 0 | 9 | 0 | 0 | 15 | 0 | |
| Lane Group Flow (vph) | 0 | 270 | 0 | 0 | 184 | 46 | 26 | 985 | 0 | 51 | 413 | 0 | |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | 5 | | 2 | 2 | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 19.9 | | | 19.9 | 19.9 | 3.0 | 26.9 | | 5.1 | 28.5 | | |
| Effective Green, g (s) | | 19.9 | | | 19.9 | 19.9 | 3.0 | 26.9 | | 5.1 | 28.5 | | |
| Actuated g/C Ratio | | 0.31 | | | 0.31 | 0.31 | 0.05 | 0.41 | | 0.08 | 0.44 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 376 | | | 394 | 398 | 74 | 1251 | | 122 | 1312 | | |
| v/s Ratio Prot | | | | | | | 0.02 | c0.33 | | c0.03 | 0.14 | | |
| v/s Ratio Perm | | c0.22 | | | 0.14 | 0.04 | | | | | | | |
| v/c Ratio | | 0.72 | | | 0.47 | 0.12 | 0.35 | 0.79 | | 0.42 | 0.31 | | |
| Uniform Delay, d1 | | 20.1 | | | 18.3 | 16.3 | 30.1 | 16.6 | | 28.6 | 11.9 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 6.8 | | | 1.2 | 0.2 | 3.9 | 3.6 | | 3.1 | 0.2 | | |
| Delay (s) | | 26.9 | | | 19.5 | 16.5 | 34.0 | 20.2 | | 31.7 | 12.1 | | |
| Level of Service | | C | | | B | B | C | C | | C | B | | |
| Approach Delay (s) | | 26.9 | | | 18.1 | | | 20.5 | | | 14.2 | | |
| Approach LOS | | C | | | B | | | C | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 19.5 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.73 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 65.1 | | | | | | | | | Sum of lost time (s) | 13.7 |
| Intersection Capacity Utilization | | | 64.1% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

Existing AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 28 | 249 | 359 | 183 | 129 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 31 | 280 | 403 | 206 | 145 | 58 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 52 | 0 | 50 |
| Lane Group Flow (vph) | 31 | 280 | 403 | 154 | 145 | 8 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 4.7 | 85.9 | 77.2 | 77.2 | 15.5 | 15.5 |
| Effective Green, g (s) | 4.7 | 85.9 | 77.2 | 77.2 | 15.5 | 15.5 |
| Actuated g/C Ratio | 0.04 | 0.78 | 0.70 | 0.70 | 0.14 | 0.14 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 69 | 1426 | 1196 | 1092 | 220 | 190 |
| v/s Ratio Prot | c0.02 | 0.15 | c0.24 | | c0.09 | |
| v/s Ratio Perm | | | | 0.10 | | 0.01 |
| v/c Ratio | 0.45 | 0.20 | 0.34 | 0.14 | 0.66 | 0.04 |
| Uniform Delay, d1 | 51.4 | 3.1 | 6.4 | 5.4 | 44.7 | 40.8 |
| Progression Factor | 1.00 | 1.00 | 1.32 | 2.04 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.7 | 0.3 | 0.6 | 0.2 | 7.0 | 0.1 |
| Delay (s) | 53.1 | 3.4 | 9.1 | 11.3 | 51.7 | 40.9 |
| Level of Service | D | A | A | B | D | D |
| Approach Delay (s) | | 8.4 | 9.8 | | 48.6 | |
| Approach LOS | | A | A | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.4 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 38.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis Existing AM
 8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBT | EBR | WBL | WBT | WBR | NBL2 | NBL | NBR | SBT | SEL | SER |
|------------------------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | ↑ | ↗ | ↖ | ↗ | | | ↘ | ↗ | ↕ | ↘ | |
| Volume (vph) | 287 | 105 | 179 | 312 | 1 | 271 | 5 | 220 | 7 | 0 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 9 | 10 | 10 | 11 | 11 | 16 | 12 | 12 | 12 |
| Total Lost time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.97 | 1.00 | 1.00 | | | 1.00 | 0.97 | 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 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.86 | |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| Peak-hour factor, PHF | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Adj. Flow (vph) | 359 | 131 | 224 | 390 | 1 | 339 | 6 | 275 | 9 | 0 | 9 |
| RTOR Reduction (vph) | 0 | 85 | 0 | 0 | 0 | 0 | 0 | 123 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 359 | 46 | 224 | 391 | 0 | 0 | 345 | 152 | 9 | 9 | 0 |
| Confl. Peds. (#/hr) | | 14 | | | | | | 2 | | 2 | |
| Confl. Bikes (#/hr) | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Turn Type | NA | Perm | Prot | NA | | Prot | Prot | Perm | NA | Prot | |
| Protected Phases | 2 | | 1 | 6 | | 4 | 4 | | 8 | 7 | |
| Permitted Phases | | 2 | | | | | | 4 | | | |
| Actuated Green, G (s) | 38.7 | 38.7 | 19.8 | 62.5 | | | 27.1 | 27.1 | 1.4 | 2.4 | |
| Effective Green, g (s) | 38.7 | 38.7 | 19.8 | 62.5 | | | 27.1 | 27.1 | 1.4 | 2.4 | |
| Actuated g/C Ratio | 0.35 | 0.35 | 0.18 | 0.57 | | | 0.25 | 0.25 | 0.01 | 0.02 | |
| Clearance Time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 618 | 506 | 281 | 968 | | | 413 | 421 | 23 | 34 | |
| v/s Ratio Prot | c0.20 | | c0.14 | 0.23 | | | c0.21 | | c0.00 | c0.01 | |
| v/s Ratio Perm | | 0.03 | | | | | | 0.09 | | | |
| v/c Ratio | 0.58 | 0.09 | 0.80 | 0.40 | | | 0.84 | 0.36 | 0.39 | 0.26 | |
| Uniform Delay, d1 | 29.0 | 23.9 | 43.2 | 13.3 | | | 39.3 | 34.3 | 53.9 | 52.9 | |
| Progression Factor | 1.00 | 1.14 | 1.00 | 1.00 | | | 1.11 | 1.26 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.9 | 0.4 | 14.5 | 1.3 | | | 12.8 | 0.5 | 10.7 | 4.1 | |
| Delay (s) | 33.0 | 27.6 | 57.6 | 14.6 | | | 56.3 | 43.7 | 64.5 | 57.1 | |
| Level of Service | C | C | E | B | | | E | D | E | E | |
| Approach Delay (s) | 31.6 | | | 30.3 | | | | | 64.5 | 57.1 | |
| Approach LOS | C | | | C | | | | | E | E | |

Intersection Summary

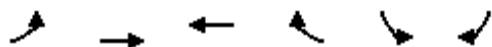
| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 38.2 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.69 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 20.6 |
| Intersection Capacity Utilization | 79.0% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

Existing AM



















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | ↑ | ↗ | ↗ | |
| Volume (veh/h) | 1 | 72 | 126 | 14 | 26 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Hourly flow rate (vph) | 1 | 77 | 135 | 15 | 28 | 10 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 151 | | | | 215 | 135 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 151 | | | | 215 | 135 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 96 | 99 |
| cM capacity (veh/h) | 1431 | | | | 773 | 913 |

| Direction, Lane # | EB 1 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|
| Volume Total | 78 | 135 | 15 | 38 |
| Volume Left | 1 | 0 | 0 | 28 |
| Volume Right | 0 | 0 | 15 | 10 |
| cSH | 1431 | 1700 | 1700 | 804 |
| Volume to Capacity | 0.00 | 0.08 | 0.01 | 0.05 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 4 |
| Control Delay (s) | 0.1 | 0.0 | 0.0 | 9.7 |
| Lane LOS | A | | | A |
| Approach Delay (s) | 0.1 | 0.0 | | 9.7 |
| Approach LOS | | | | A |

| Intersection Summary | | | |
|-----------------------------------|--|-------|------------------------|
| Average Delay | | 1.4 | |
| Intersection Capacity Utilization | | 16.6% | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

Existing AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 33 | 123 | 10 | 23 | 88 | 79 | 10 | 130 | 50 | 42 | 51 | 14 |
| Peak Hour Factor | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 |
| Hourly flow rate (vph) | 45 | 168 | 14 | 32 | 121 | 108 | 14 | 178 | 68 | 58 | 70 | 19 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 227 | 260 | 260 | 147 | | | | | | | | |
| Volume Left (vph) | 45 | 32 | 14 | 58 | | | | | | | | |
| Volume Right (vph) | 14 | 108 | 68 | 19 | | | | | | | | |
| Hadj (s) | 0.04 | -0.19 | -0.11 | 0.03 | | | | | | | | |
| Departure Headway (s) | 5.5 | 5.3 | 5.4 | 5.7 | | | | | | | | |
| Degree Utilization, x | 0.35 | 0.38 | 0.39 | 0.23 | | | | | | | | |
| Capacity (veh/h) | 598 | 632 | 610 | 556 | | | | | | | | |
| Control Delay (s) | 11.5 | 11.4 | 11.8 | 10.5 | | | | | | | | |
| Approach Delay (s) | 11.5 | 11.4 | 11.8 | 10.5 | | | | | | | | |
| Approach LOS | B | B | B | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 11.4 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 40.5% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

Existing AM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 53 | 210 | 65 | 138 | 144 | 291 | 10 | 597 | 248 | 174 | 228 | 27 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 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 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 1739 | 1448 | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 3026 | | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 1739 | 1448 | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 3026 | | |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | |
| Adj. Flow (vph) | 58 | 231 | 71 | 152 | 158 | 320 | 11 | 656 | 273 | 191 | 251 | 30 | |
| RTOR Reduction (vph) | 0 | 0 | 57 | 0 | 0 | 233 | 0 | 0 | 101 | 0 | 5 | 0 | |
| Lane Group Flow (vph) | 58 | 231 | 14 | 152 | 158 | 87 | 11 | 656 | 172 | 191 | 276 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 8.5 | 20.7 | 20.7 | 16.6 | 28.8 | 28.8 | 1.4 | 31.3 | 31.3 | 19.2 | 49.1 | | |
| Effective Green, g (s) | 8.5 | 20.7 | 20.7 | 16.6 | 28.8 | 28.8 | 1.4 | 31.3 | 31.3 | 19.2 | 49.1 | | |
| Actuated g/C Ratio | 0.08 | 0.20 | 0.20 | 0.16 | 0.27 | 0.27 | 0.01 | 0.30 | 0.30 | 0.18 | 0.46 | | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 132 | 340 | 283 | 254 | 473 | 380 | 21 | 958 | 394 | 293 | 1404 | | |
| v/s Ratio Prot | 0.04 | c0.13 | | c0.09 | 0.09 | | 0.01 | c0.20 | | c0.12 | 0.09 | | |
| v/s Ratio Perm | | | 0.01 | | | 0.06 | | | 0.13 | | | | |
| v/c Ratio | 0.44 | 0.68 | 0.05 | 0.60 | 0.33 | 0.23 | 0.52 | 0.68 | 0.44 | 0.65 | 0.20 | | |
| Uniform Delay, d1 | 46.4 | 39.5 | 34.6 | 41.5 | 30.8 | 29.9 | 51.9 | 32.9 | 30.1 | 40.2 | 16.7 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 3.2 | 5.8 | 0.1 | 4.4 | 0.6 | 0.4 | 27.4 | 2.2 | 1.1 | 5.7 | 0.1 | | |
| Delay (s) | 49.5 | 45.3 | 34.7 | 45.9 | 31.4 | 30.3 | 79.3 | 35.1 | 31.2 | 45.9 | 16.8 | | |
| Level of Service | D | D | C | D | C | C | E | D | C | D | B | | |
| Approach Delay (s) | | 43.9 | | | 34.3 | | | 34.5 | | | 28.6 | | |
| Approach LOS | | D | | | C | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 34.7 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.66 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.8 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 60.3% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|------|-------|------|------|------|-------|-------|------|---------------------------|------|
| Lane Configurations | ↖ | ↗↖↗ | | ↖↗ | ↖↗ | | ↖ | ↗↖↗ | ↖↗ | ↖↗ | ↗↖↗ | ↖↗ | |
| Volume (vph) | 36 | 621 | 21 | 498 | 669 | 237 | 41 | 203 | 482 | 164 | 140 | 28 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 4.0 | 4.0 | 5.5 | 5.5 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4632 | | 3255 | 3099 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4632 | | 3255 | 3099 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 | |
| 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) | 39 | 675 | 23 | 541 | 727 | 258 | 45 | 221 | 524 | 178 | 152 | 30 | |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | |
| Lane Group Flow (vph) | 39 | 695 | 0 | 541 | 953 | 0 | 45 | 221 | 524 | 178 | 152 | 6 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 6.0 | 21.5 | | 26.0 | 41.5 | | 20.5 | 27.5 | 53.5 | 16.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 6.0 | 21.5 | | 26.0 | 41.5 | | 20.5 | 27.5 | 53.5 | 16.0 | 23.0 | 23.0 | |
| Actuated g/C Ratio | 0.05 | 0.20 | | 0.24 | 0.38 | | 0.19 | 0.25 | 0.49 | 0.15 | 0.21 | 0.21 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 85 | 905 | | 769 | 1169 | | 312 | 838 | 1316 | 473 | 677 | 307 | |
| v/s Ratio Prot | 0.02 | c0.15 | | 0.17 | c0.31 | | 0.03 | 0.07 | c0.19 | c0.05 | 0.05 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 | |
| v/c Ratio | 0.46 | 0.77 | | 0.70 | 0.81 | | 0.14 | 0.26 | 0.40 | 0.38 | 0.22 | 0.02 | |
| Uniform Delay, d1 | 50.4 | 41.9 | | 38.5 | 30.8 | | 37.4 | 33.1 | 18.0 | 42.5 | 36.1 | 34.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.11 | 1.12 | 0.74 | 1.18 | 0.96 | 1.00 | |
| Incremental Delay, d2 | 5.3 | 6.2 | | 5.3 | 6.3 | | 1.0 | 0.2 | 0.3 | 2.0 | 0.2 | 0.0 | |
| Delay (s) | 55.7 | 48.1 | | 43.8 | 37.1 | | 42.3 | 37.2 | 13.6 | 52.3 | 34.7 | 34.6 | |
| Level of Service | E | D | | D | D | | D | D | B | D | C | C | |
| Approach Delay (s) | | 48.5 | | | 39.5 | | | 21.9 | | | 43.4 | | |
| Approach LOS | | D | | | D | | | C | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 37.8 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.62 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 70.8% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Existing AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑ | | | ↑↑↑ | | ↗ |
| Volume (veh/h) | 1267 | 0 | 0 | 1523 | 0 | 0 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1377 | 0 | 0 | 1655 | 0 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | | | |
| pX, platoon unblocked | | | 0.91 | 0.91 | 0.91 | 0.91 |
| vC, conflicting volume | | | 1377 | 1929 | 344 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 894 | 1503 | 0 | |
| tC, single (s) | | | 4.1 | 6.8 | 6.9 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | 3.5 | 3.3 | |
| p0 queue free % | | | 100 | 100 | 100 | |
| cM capacity (veh/h) | | | 683 | 102 | 982 | |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total | 393 | 393 | 393 | 197 | 552 | 552 | 552 | 0 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.23 | 0.23 | 0.23 | 0.12 | 0.32 | 0.32 | 0.32 | 0.00 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | | | | | | | | A |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | 0.0 |
| Approach LOS | | | | | | | | A |

| Intersection Summary | | | |
|-----------------------------------|--|-------|------------------------|
| Average Delay | | 0.0 | |
| Intersection Capacity Utilization | | 32.8% | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

HCM Unsignalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Existing AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | ↙ | ↑↑ | | ↗ |
| Volume (veh/h) | 890 | 0 | 396 | 1048 | 0 | 458 |
| Sign Control | Free | | | Free | Yield | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Hourly flow rate (vph) | 937 | 0 | 417 | 1103 | 0 | 482 |
| Pedestrians | | | | | 4 | |
| Lane Width (ft) | | | | | 14.0 | |
| Walking Speed (ft/s) | | | | | 4.0 | |
| Percent Blockage | | | | | 0 | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 930 | | | | | |
| pX, platoon unblocked | | | 0.89 | | 0.89 | 0.89 |
| vC, conflicting volume | | | 941 | | 2326 | 472 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 688 | | 2243 | 161 |
| tC, single (s) | | | 4.2 | | 6.8 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 47 | | 100 | 36 |
| cM capacity (veh/h) | | | 789 | | 15 | 753 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|
| Volume Total | 468 | 468 | 417 | 552 | 552 | 482 |
| Volume Left | 0 | 0 | 417 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 482 |
| cSH | 1700 | 1700 | 789 | 1700 | 1700 | 753 |
| Volume to Capacity | 0.28 | 0.28 | 0.53 | 0.32 | 0.32 | 0.64 |
| Queue Length 95th (ft) | 0 | 0 | 79 | 0 | 0 | 117 |
| Control Delay (s) | 0.0 | 0.0 | 14.6 | 0.0 | 0.0 | 17.9 |
| Lane LOS | B | | | C | | |
| Approach Delay (s) | 0.0 | | 4.0 | | 17.9 | |
| Approach LOS | | | | C | | |

| Intersection Summary | | | | | | |
|-----------------------------------|--|--|-------|----------------------|--|---|
| Average Delay | | | 5.0 | | | |
| Intersection Capacity Utilization | | | 59.6% | ICU Level of Service | | B |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

Existing AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 517 | 1293 | 717 | 0 | 0 | 732 |
| Sign Control | | Free | Free | | Yield | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Hourly flow rate (vph) | 550 | 1376 | 763 | 0 | 0 | 779 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | 841 | | | |
| pX, platoon unblocked | 0.90 | | | | 0.90 | 0.90 |
| vC, conflicting volume | 763 | | | | 2321 | 381 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 505 | | | | 2243 | 80 |
| tC, single (s) | 4.2 | | | | 6.8 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 41 | | | | 100 | 9 |
| cM capacity (veh/h) | 934 | | | | 13 | 859 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 550 | 459 | 459 | 459 | 381 | 381 | 779 |
| Volume Left | 550 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 779 |
| cSH | 934 | 1700 | 1700 | 1700 | 1700 | 1700 | 859 |
| Volume to Capacity | 0.59 | 0.27 | 0.27 | 0.27 | 0.22 | 0.22 | 0.91 |
| Queue Length 95th (ft) | 99 | 0 | 0 | 0 | 0 | 0 | 320 |
| Control Delay (s) | 14.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 34.5 |
| Lane LOS | B | | | | | | D |
| Approach Delay (s) | 4.1 | | | | 0.0 | | 34.5 |
| Approach LOS | | | | | | | D |

| Intersection Summary | | | | | | | |
|-----------------------------------|--|--|-------|--|----------------------|--|---|
| Average Delay | | | 10.0 | | | | |
| Intersection Capacity Utilization | | | 71.8% | | ICU Level of Service | | C |
| Analysis Period (min) | | | 15 | | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 114 | 752 | 366 | 127 | 807 | 30 | 199 | 32 | 72 | 18 | 83 | 107 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4626 | | 1539 | 1563 | 1513 | | 1751 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4626 | | 1539 | 1563 | 1513 | | 1751 | 1489 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 130 | 855 | 416 | 144 | 917 | 34 | 226 | 36 | 82 | 20 | 94 | 122 |
| RTOR Reduction (vph) | 0 | 0 | 256 | 0 | 3 | 0 | 0 | 0 | 68 | 0 | 0 | 109 |
| Lane Group Flow (vph) | 130 | 855 | 160 | 144 | 948 | 0 | 131 | 131 | 14 | 0 | 114 | 13 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 12.6 | 36.5 | 36.5 | 13.1 | 37.0 | | 16.3 | 16.3 | 16.3 | | 9.9 | 9.9 |
| Effective Green, g (s) | 12.6 | 36.5 | 36.5 | 13.1 | 37.0 | | 16.3 | 16.3 | 16.3 | | 9.9 | 9.9 |
| Actuated g/C Ratio | 0.13 | 0.38 | 0.38 | 0.14 | 0.39 | | 0.17 | 0.17 | 0.17 | | 0.10 | 0.10 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 214 | 1788 | 588 | 231 | 1801 | | 264 | 268 | 259 | | 182 | 155 |
| v/s Ratio Prot | 0.08 | 0.18 | | c0.09 | c0.20 | | c0.09 | 0.08 | | | c0.07 | 0.01 |
| v/s Ratio Perm | | | 0.10 | | | | | | 0.01 | | | |
| v/c Ratio | 0.61 | 0.48 | 0.27 | 0.62 | 0.53 | | 0.50 | 0.49 | 0.05 | | 0.63 | 0.08 |
| Uniform Delay, d1 | 38.9 | 22.1 | 20.1 | 38.6 | 22.3 | | 35.6 | 35.6 | 32.9 | | 40.8 | 38.4 |
| Progression Factor | 0.99 | 0.97 | 0.49 | 1.01 | 0.71 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 5.6 | 0.9 | 1.1 | 5.5 | 1.0 | | 2.0 | 1.9 | 0.1 | | 7.4 | 0.3 |
| Delay (s) | 44.1 | 22.3 | 11.0 | 44.3 | 16.9 | | 37.6 | 37.5 | 33.0 | | 48.2 | 38.8 |
| Level of Service | D | C | B | D | B | | D | D | C | | D | D |
| Approach Delay (s) | | 21.0 | | | 20.5 | | | 36.5 | | | 43.3 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 24.3 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.55 | C |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 53.9% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 54 | 532 | 131 | 105 | 666 | 14 | 166 | 165 | 167 | 20 | 162 | 43 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3278 | | 3143 | 1705 | 1660 | 3204 | 3124 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3278 | | 3143 | 1705 | 1660 | 3204 | 3124 | |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 60 | 591 | 146 | 117 | 740 | 16 | 184 | 183 | 186 | 22 | 180 | 48 |
| RTOR Reduction (vph) | 0 | 0 | 88 | 0 | 1 | 0 | 0 | 0 | 140 | 0 | 28 | 0 |
| Lane Group Flow (vph) | 60 | 591 | 58 | 117 | 755 | 0 | 184 | 183 | 46 | 22 | 200 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 7.0 | 37.8 | 37.8 | 12.5 | 43.3 | | 11.4 | 23.6 | 23.6 | 3.1 | 15.7 | |
| Effective Green, g (s) | 7.0 | 37.8 | 37.8 | 12.5 | 43.3 | | 11.4 | 23.6 | 23.6 | 3.1 | 15.7 | |
| Actuated g/C Ratio | 0.07 | 0.40 | 0.40 | 0.13 | 0.46 | | 0.12 | 0.25 | 0.25 | 0.03 | 0.17 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 119 | 1314 | 597 | 217 | 1494 | | 377 | 423 | 412 | 104 | 516 | |
| v/s Ratio Prot | 0.04 | 0.18 | | c0.07 | c0.23 | | c0.06 | c0.11 | | 0.01 | 0.06 | |
| v/s Ratio Perm | | | 0.04 | | | | | | 0.03 | | | |
| v/c Ratio | 0.50 | 0.45 | 0.10 | 0.54 | 0.51 | | 0.49 | 0.43 | 0.11 | 0.21 | 0.39 | |
| Uniform Delay, d1 | 42.3 | 21.0 | 17.9 | 38.6 | 18.3 | | 39.1 | 30.1 | 27.6 | 44.8 | 35.4 | |
| Progression Factor | 0.92 | 0.75 | 2.19 | 1.25 | 0.59 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.1 | 1.0 | 0.3 | 1.1 | 0.4 | | 1.4 | 1.0 | 0.2 | 1.4 | 0.7 | |
| Delay (s) | 40.1 | 16.8 | 39.4 | 49.1 | 11.2 | | 40.4 | 31.0 | 27.8 | 46.1 | 36.0 | |
| Level of Service | D | B | D | D | B | | D | C | C | D | D | |
| Approach Delay (s) | | 22.7 | | | 16.2 | | | 33.1 | | | 36.9 | |
| Approach LOS | | C | | | B | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 24.2 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.52 | | |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 50.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 222 | 180 | 305 | 4 | 230 | 29 | 399 | 833 | 7 | 39 | 444 | 168 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1737 | 1479 | 1652 | 3534 | | 1652 | 3151 | |
| Flt Permitted | 0.25 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 442 | 1739 | 1770 | | 1728 | 1479 | 1652 | 3534 | | 1652 | 3151 | |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 252 | 205 | 347 | 5 | 261 | 33 | 453 | 947 | 8 | 44 | 505 | 191 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 26 | 0 | 1 | 0 | 0 | 42 | 0 |
| Lane Group Flow (vph) | 252 | 205 | 347 | 0 | 266 | 7 | 453 | 954 | 0 | 44 | 654 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 36.7 | 36.7 | 95.0 | | 19.0 | 19.0 | 24.3 | 38.3 | | 5.5 | 19.0 | |
| Effective Green, g (s) | 36.7 | 36.7 | 95.0 | | 19.0 | 19.0 | 24.3 | 38.3 | | 5.5 | 19.0 | |
| Actuated g/C Ratio | 0.39 | 0.39 | 1.00 | | 0.20 | 0.20 | 0.26 | 0.40 | | 0.06 | 0.20 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 345 | 671 | 1770 | | 345 | 295 | 422 | 1424 | | 95 | 630 | |
| v/s Ratio Prot | c0.11 | 0.12 | | | | | c0.27 | 0.27 | | 0.03 | c0.21 | |
| v/s Ratio Perm | c0.18 | | 0.20 | | 0.15 | 0.00 | | | | | | |
| v/c Ratio | 0.73 | 0.31 | 0.20 | | 0.77 | 0.02 | 1.07 | 0.67 | | 0.46 | 1.04 | |
| Uniform Delay, d1 | 22.3 | 20.3 | 0.0 | | 35.9 | 30.5 | 35.4 | 23.2 | | 43.3 | 38.0 | |
| Progression Factor | 0.89 | 0.81 | 1.00 | | 1.00 | 1.00 | 1.12 | 0.72 | | 0.89 | 0.88 | |
| Incremental Delay, d2 | 7.3 | 0.3 | 0.2 | | 10.8 | 0.0 | 64.0 | 2.4 | | 3.4 | 45.4 | |
| Delay (s) | 27.2 | 16.8 | 0.2 | | 46.7 | 30.6 | 103.5 | 19.1 | | 41.7 | 78.7 | |
| Level of Service | C | B | A | | D | C | F | B | | D | E | |
| Approach Delay (s) | | 12.9 | | | 44.9 | | | 46.3 | | | 76.5 | |
| Approach LOS | | B | | | D | | | D | | | E | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 44.8 | HCM 2000 Level of Service D |
| HCM 2000 Volume to Capacity ratio | 0.94 | |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) 19.0 |
| Intersection Capacity Utilization | 84.2% | ICU Level of Service E |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

Existing AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 16 | 8 | 16 | 51 | 106 | 14 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Hourly flow rate (vph) | 19 | 10 | 19 | 61 | 126 | 17 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 29 | 80 | 143 | | | |
| Volume Left (vph) | 19 | 19 | 0 | | | |
| Volume Right (vph) | 10 | 0 | 17 | | | |
| Hadj (s) | -0.03 | 0.08 | -0.04 | | | |
| Departure Headway (s) | 4.3 | 4.2 | 4.0 | | | |
| Degree Utilization, x | 0.03 | 0.09 | 0.16 | | | |
| Capacity (veh/h) | 785 | 839 | 885 | | | |
| Control Delay (s) | 7.5 | 7.6 | 7.8 | | | |
| Approach Delay (s) | 7.5 | 7.6 | 7.8 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.7 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 20.2% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

Existing AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 7 | 3 | 5 | 56 | 101 | 11 |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Hourly flow rate (vph) | 9 | 4 | 6 | 68 | 123 | 13 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 12 | 74 | 137 | | | |
| Volume Left (vph) | 9 | 6 | 0 | | | |
| Volume Right (vph) | 4 | 0 | 13 | | | |
| Hadj (s) | -0.01 | 0.05 | -0.02 | | | |
| Departure Headway (s) | 4.3 | 4.1 | 4.0 | | | |
| Degree Utilization, x | 0.01 | 0.08 | 0.15 | | | |
| Capacity (veh/h) | 787 | 858 | 896 | | | |
| Control Delay (s) | 7.4 | 7.5 | 7.7 | | | |
| Approach Delay (s) | 7.4 | 7.5 | 7.7 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.6 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 17.1% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive



















Existing AM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|------|-------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 71 | 26 | 60 | 41 | 16 | 88 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Hourly flow rate (vph) | 80 | 29 | 67 | 46 | 18 | 99 |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 109 | 113 | 117 | | | |
| Volume Left (vph) | 80 | 0 | 18 | | | |
| Volume Right (vph) | 29 | 46 | 0 | | | |
| Hadj (s) | 0.02 | -0.21 | 0.06 | | | |
| Departure Headway (s) | 4.4 | 4.1 | 4.3 | | | |
| Degree Utilization, x | 0.13 | 0.13 | 0.14 | | | |
| Capacity (veh/h) | 774 | 850 | 805 | | | |
| Control Delay (s) | 8.1 | 7.7 | 8.1 | | | |
| Approach Delay (s) | 8.1 | 7.7 | 8.1 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.9 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 24.4% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Existing AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | Stop | | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 12 | 113 | 9 | 14 | 74 | 34 | 9 | 62 | 46 | 30 | 17 | 8 |
| 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 |
| Hourly flow rate (vph) | 13 | 123 | 10 | 15 | 80 | 37 | 10 | 67 | 50 | 33 | 18 | 9 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 13 | 133 | 133 | 127 | 60 | | | | | | | |
| Volume Left (vph) | 13 | 0 | 15 | 10 | 33 | | | | | | | |
| Volume Right (vph) | 0 | 10 | 37 | 50 | 9 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | -0.11 | -0.19 | 0.06 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.1 | 4.5 | 4.5 | 4.8 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.19 | 0.17 | 0.16 | 0.08 | | | | | | | |
| Capacity (veh/h) | 618 | 681 | 751 | 756 | 696 | | | | | | | |
| Control Delay (s) | 7.5 | 8.0 | 8.4 | 8.3 | 8.2 | | | | | | | |
| Approach Delay (s) | 8.0 | | 8.4 | 8.3 | 8.2 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.2 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 32.9% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 82 | 81 | 27 | 27 | 70 | 157 | 32 | 525 | 47 | 111 | 230 | 35 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1689 | 1259 | 1620 | 1739 | 1316 | 1711 | 3034 | | 1620 | 3014 | |
| Flt Permitted | | 0.80 | 1.00 | 0.64 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1386 | 1259 | 1095 | 1739 | 1316 | 1711 | 3034 | | 1620 | 3014 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 92 | 91 | 30 | 30 | 79 | 176 | 36 | 590 | 53 | 125 | 258 | 39 |
| RTOR Reduction (vph) | 0 | 0 | 23 | 0 | 0 | 134 | 0 | 8 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 0 | 183 | 7 | 30 | 79 | 42 | 36 | 635 | 0 | 125 | 284 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 2.7 | 21.1 | | 8.1 | 26.5 | |
| Effective Green, g (s) | | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 2.7 | 21.1 | | 8.1 | 26.5 | |
| Actuated g/C Ratio | | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.05 | 0.36 | | 0.14 | 0.46 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 329 | 299 | 260 | 413 | 313 | 79 | 1103 | | 226 | 1377 | |
| v/s Ratio Prot | | | | | 0.05 | | 0.02 | c0.21 | | c0.08 | 0.09 | |
| v/s Ratio Perm | | c0.13 | 0.01 | 0.03 | | 0.03 | | | | | | |
| v/c Ratio | | 0.56 | 0.02 | 0.12 | 0.19 | 0.13 | 0.46 | 0.58 | | 0.55 | 0.21 | |
| Uniform Delay, d1 | | 19.4 | 16.9 | 17.3 | 17.6 | 17.4 | 26.9 | 14.8 | | 23.3 | 9.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 2.0 | 0.0 | 0.2 | 0.2 | 0.2 | 4.1 | 0.9 | | 2.9 | 0.1 | |
| Delay (s) | | 21.4 | 17.0 | 17.5 | 17.9 | 17.6 | 31.1 | 15.7 | | 26.2 | 9.5 | |
| Level of Service | | C | B | B | B | B | C | B | | C | A | |
| Approach Delay (s) | | 20.8 | | | 17.7 | | | 16.5 | | | 14.5 | |
| Approach LOS | | C | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.56 | | |
| Actuated Cycle Length (s) | 58.0 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 52.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 114 | 126 | 48 | 114 | 154 | 52 | 85 | 566 | 88 | 30 | 348 | 54 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3164 | | 1593 | 3157 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3164 | | 1593 | 3157 | |
| 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) | 124 | 137 | 52 | 124 | 167 | 57 | 92 | 615 | 96 | 33 | 378 | 59 |
| RTOR Reduction (vph) | 0 | 0 | 42 | 0 | 0 | 46 | 0 | 10 | 0 | 0 | 11 | 0 |
| Lane Group Flow (vph) | 124 | 137 | 10 | 124 | 167 | 11 | 92 | 701 | 0 | 33 | 426 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 13.9 | 22.0 | 22.0 | 13.9 | 22.0 | 22.0 | 9.9 | 49.1 | | 6.0 | 45.2 | |
| Effective Green, g (s) | 13.9 | 22.0 | 22.0 | 13.9 | 22.0 | 22.0 | 9.9 | 49.1 | | 6.0 | 45.2 | |
| Actuated g/C Ratio | 0.13 | 0.20 | 0.20 | 0.13 | 0.20 | 0.20 | 0.09 | 0.45 | | 0.05 | 0.41 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 199 | 369 | 261 | 201 | 372 | 270 | 148 | 1412 | | 86 | 1297 | |
| v/s Ratio Prot | c0.08 | 0.07 | | c0.08 | c0.09 | | c0.06 | c0.22 | | 0.02 | c0.14 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.62 | 0.37 | 0.04 | 0.62 | 0.45 | 0.04 | 0.62 | 0.50 | | 0.38 | 0.33 | |
| Uniform Delay, d1 | 45.6 | 38.0 | 35.5 | 45.5 | 38.7 | 35.5 | 48.2 | 21.7 | | 50.2 | 22.1 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.06 | 0.94 | | 1.22 | 1.18 | |
| Incremental Delay, d2 | 6.7 | 0.9 | 0.1 | 6.3 | 1.2 | 0.1 | 8.6 | 1.2 | | 3.8 | 0.7 | |
| Delay (s) | 52.3 | 38.9 | 35.6 | 51.8 | 39.8 | 35.6 | 59.8 | 21.6 | | 65.1 | 26.8 | |
| Level of Service | D | D | D | D | D | D | E | C | | E | C | |
| Approach Delay (s) | | 43.6 | | | 43.4 | | | 26.0 | | | 29.5 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 32.8 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.52 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 63.0% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|--------|------|------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 3 | 198 | 7 | 6 | 326 | 16 | 2 | 0 | 0 | 2 | 0 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.99 | | | 1.00 | | | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.95 | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 1854 | | | 3512 | | | 1770 | | | 1722 | |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | 1770 | 1854 | | | 3345 | | | 1863 | | | 1779 | |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 3 | 208 | 7 | 6 | 343 | 17 | 2 | 0 | 0 | 2 | 0 | 1 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 3 | 215 | 0 | 0 | 362 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 0.5 | 35.9 | | | 30.5 | | | 2.5 | | | 2.5 | |
| Effective Green, g (s) | 0.5 | 35.9 | | | 30.5 | | | 2.5 | | | 2.5 | |
| Actuated g/C Ratio | 0.01 | 0.76 | | | 0.64 | | | 0.05 | | | 0.05 | |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Grp Cap (vph) | 18 | 1407 | | | 2156 | | | 98 | | | 94 | |
| v/s Ratio Prot | 0.00 | c0.12 | | | | | | | | | | |
| v/s Ratio Perm | | | | | c0.11 | | | c0.00 | | | 0.00 | |
| v/c Ratio | 0.17 | 0.15 | | | 1.70dr | | | 0.02 | | | 0.00 | |
| Uniform Delay, d1 | 23.2 | 1.6 | | | 3.3 | | | 21.2 | | | 21.2 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 1.6 | 0.1 | | | 0.1 | | | 0.1 | | | 0.0 | |
| Delay (s) | 24.8 | 1.6 | | | 3.4 | | | 21.4 | | | 21.2 | |
| Level of Service | C | A | | | A | | | C | | | C | |
| Approach Delay (s) | | 1.9 | | | 3.4 | | | 21.4 | | | 21.2 | |
| Approach LOS | | A | | | A | | | C | | | C | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 3.0 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.17 | | |
| Actuated Cycle Length (s) | 47.3 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 24.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

26: Miller St & Fairway Dr/Aladdin Ave

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|-------|------|-------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 281 | 31 | 72 | 411 | 0 | 12 | 0 | 12 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | | | |
| Lane Util. Factor | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | | | |
| Frbp, ped/bikes | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | | | |
| Flpb, ped/bikes | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | | | |
| Frt | | 0.99 | | 1.00 | 1.00 | | 1.00 | 0.85 | | | | |
| Flt Protected | | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | | | |
| Satd. Flow (prot) | | 1831 | | 1593 | 1987 | | 1711 | 1531 | | | | |
| Flt Permitted | | 1.00 | | 0.95 | 1.00 | | 0.87 | 1.00 | | | | |
| Satd. Flow (perm) | | 1831 | | 1593 | 1987 | | 1566 | 1531 | | | | |
| Peak-hour factor, PHF | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 0 | 327 | 36 | 84 | 478 | 0 | 14 | 0 | 14 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 360 | 0 | 84 | 478 | 0 | 14 | 1 | 0 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | | 26.4 | | 6.3 | 37.6 | | 4.6 | 4.6 | | | | |
| Effective Green, g (s) | | 26.4 | | 6.3 | 37.6 | | 4.6 | 4.6 | | | | |
| Actuated g/C Ratio | | 0.52 | | 0.12 | 0.74 | | 0.09 | 0.09 | | | | |
| Clearance Time (s) | | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | | | |
| Vehicle Extension (s) | | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | | | |
| Lane Grp Cap (vph) | | 945 | | 196 | 1462 | | 140 | 137 | | | | |
| v/s Ratio Prot | | c0.20 | | 0.05 | c0.24 | | | 0.00 | | | | |
| v/s Ratio Perm | | | | | | | c0.01 | | | | | |
| v/c Ratio | | 0.38 | | 0.43 | 0.33 | | 0.10 | 0.01 | | | | |
| Uniform Delay, d1 | | 7.4 | | 20.7 | 2.3 | | 21.3 | 21.2 | | | | |
| Progression Factor | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | | | |
| Incremental Delay, d2 | | 0.4 | | 0.5 | 0.2 | | 0.4 | 0.0 | | | | |
| Delay (s) | | 7.8 | | 21.3 | 2.5 | | 21.8 | 21.2 | | | | |
| Level of Service | | A | | C | A | | C | C | | | | |
| Approach Delay (s) | | 7.8 | | | 5.3 | | | 21.5 | | | 0.0 | |
| Approach LOS | | A | | | A | | | C | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 6.7 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.40 | | |
| Actuated Cycle Length (s) | 51.1 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 39.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

27: Teagarden St & Aladdin Ave

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 38 | 153 | 41 | 10 | 190 | 40 | 59 | 111 | 11 | 75 | 152 | 152 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1957 | | 1711 | 1668 | | 1652 | 1833 | | 1646 | 1758 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.48 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1957 | | 1711 | 1668 | | 839 | 1833 | | 1166 | 1758 | |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Adj. Flow (vph) | 41 | 165 | 44 | 11 | 204 | 43 | 63 | 119 | 12 | 81 | 163 | 163 |
| RTOR Reduction (vph) | 0 | 14 | 0 | 0 | 11 | 0 | 0 | 5 | 0 | 0 | 49 | 0 |
| Lane Group Flow (vph) | 41 | 195 | 0 | 11 | 236 | 0 | 63 | 126 | 0 | 81 | 277 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 14 | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | | 5 | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 2.5 | 15.6 | | 0.9 | 14.0 | | 14.1 | 14.1 | | 14.1 | 14.1 | |
| Effective Green, g (s) | 2.5 | 15.6 | | 0.9 | 14.0 | | 14.1 | 14.1 | | 14.1 | 14.1 | |
| Actuated g/C Ratio | 0.06 | 0.36 | | 0.02 | 0.32 | | 0.32 | 0.32 | | 0.32 | 0.32 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 98 | 700 | | 35 | 535 | | 271 | 592 | | 377 | 568 | |
| v/s Ratio Prot | c0.02 | 0.10 | | 0.01 | c0.14 | | | 0.07 | | | c0.16 | |
| v/s Ratio Perm | | | | | | | 0.08 | | | 0.07 | | |
| v/c Ratio | 0.42 | 0.28 | | 0.31 | 0.44 | | 0.23 | 0.21 | | 0.21 | 0.49 | |
| Uniform Delay, d1 | 19.8 | 10.0 | | 21.0 | 11.7 | | 10.8 | 10.7 | | 10.7 | 11.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.9 | 0.3 | | 6.9 | 0.8 | | 0.6 | 0.2 | | 0.4 | 0.9 | |
| Delay (s) | 23.8 | 10.3 | | 28.0 | 12.5 | | 11.4 | 11.0 | | 11.1 | 12.8 | |
| Level of Service | C | B | | C | B | | B | B | | B | B | |
| Approach Delay (s) | | 12.5 | | | 13.2 | | | 11.1 | | | 12.4 | |
| Approach LOS | | B | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 12.4 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.46 | | |
| Actuated Cycle Length (s) | 43.6 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 54.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|-------|------|------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↑ | ↗ | ↖ | ↗ | |
| Volume (vph) | 136 | 17 | 37 | 2 | 12 | 10 | 148 | 434 | 15 | 7 | 186 | 113 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.90 | | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1589 | | 1652 | 1602 | | 1652 | 1705 | 1452 | 1711 | 3188 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1589 | | 1652 | 1602 | | 1652 | 1705 | 1452 | 1711 | 3188 | |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 156 | 20 | 43 | 2 | 14 | 11 | 170 | 499 | 17 | 8 | 214 | 130 |
| RTOR Reduction (vph) | 0 | 29 | 0 | 0 | 9 | 0 | 0 | 0 | 10 | 0 | 98 | 0 |
| Lane Group Flow (vph) | 156 | 34 | 0 | 2 | 16 | 0 | 170 | 499 | 7 | 8 | 246 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | 0 | 0 | | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 10.0 | 22.5 | | 1.1 | 13.6 | | 13.4 | 29.8 | 29.8 | 1.2 | 17.6 | |
| Effective Green, g (s) | 10.0 | 22.5 | | 1.1 | 13.6 | | 13.4 | 29.8 | 29.8 | 1.2 | 17.6 | |
| Actuated g/C Ratio | 0.14 | 0.32 | | 0.02 | 0.19 | | 0.19 | 0.42 | 0.42 | 0.02 | 0.25 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 232 | 502 | | 25 | 306 | | 311 | 714 | 608 | 28 | 789 | |
| v/s Ratio Prot | c0.09 | c0.02 | | 0.00 | 0.01 | | c0.10 | c0.29 | | 0.00 | 0.08 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 0.67 | 0.07 | | 0.08 | 0.05 | | 0.55 | 0.70 | 0.01 | 0.29 | 0.31 | |
| Uniform Delay, d1 | 29.0 | 17.0 | | 34.5 | 23.5 | | 26.1 | 17.0 | 12.1 | 34.5 | 21.8 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 9.6 | 0.1 | | 2.9 | 0.2 | | 3.4 | 3.8 | 0.0 | 11.4 | 0.5 | |
| Delay (s) | 38.6 | 17.1 | | 37.4 | 23.6 | | 29.5 | 20.8 | 12.1 | 45.9 | 22.3 | |
| Level of Service | D | B | | D | C | | C | C | B | D | C | |
| Approach Delay (s) | | 32.4 | | | 24.7 | | | 22.7 | | | 22.8 | |
| Approach LOS | | C | | | C | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 24.4 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.55 | | |
| Actuated Cycle Length (s) | 71.1 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 51.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↗ | ↖ | ↕↕↕ | | ↖ | ↕↕ | |
| Volume (vph) | 3 | 2 | 0 | 5 | 0 | 15 | 4 | 735 | 7 | 40 | 611 | 5 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1808 | | | 1562 | 1397 | 1648 | 4946 | | 1617 | 3467 | |
| Flt Permitted | | 0.86 | | | 0.75 | 1.00 | 0.41 | 1.00 | | 0.34 | 1.00 | |
| Satd. Flow (perm) | | 1606 | | | 1241 | 1397 | 703 | 4946 | | 586 | 3467 | |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 3 | 2 | 0 | 5 | 0 | 16 | 4 | 774 | 7 | 42 | 643 | 5 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 5 | 0 | 0 | 5 | 1 | 4 | 781 | 0 | 42 | 648 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Effective Green, g (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | 0.06 | 0.86 | 0.86 | | 0.86 | 0.86 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 103 | | | 80 | 90 | 602 | 4240 | | 502 | 2972 | |
| v/s Ratio Prot | | | | | | | | 0.16 | | | c0.19 | |
| v/s Ratio Perm | | 0.00 | | | c0.00 | 0.00 | 0.01 | | | 0.07 | | |
| v/c Ratio | | 0.05 | | | 0.06 | 0.01 | 0.01 | 0.18 | | 0.08 | 0.22 | |
| Uniform Delay, d1 | | 48.3 | | | 48.3 | 48.2 | 1.1 | 1.3 | | 1.2 | 1.4 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.19 | 0.22 | | 0.08 | 0.10 | |
| Incremental Delay, d2 | | 0.2 | | | 0.3 | 0.1 | 0.0 | 0.1 | | 0.3 | 0.1 | |
| Delay (s) | | 48.5 | | | 48.7 | 48.2 | 0.2 | 0.4 | | 0.4 | 0.3 | |
| Level of Service | | D | | | D | D | A | A | | A | A | |
| Approach Delay (s) | | 48.5 | | | 48.3 | | | 0.4 | | | 0.3 | |
| Approach LOS | | D | | | D | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 1.2 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.21 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 36.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
30: Merced Street & Republic Ave

Existing AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 32 | 7 | 9 | 769 | 733 | 7 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 36 | 8 | 10 | 854 | 814 | 8 |
| Pedestrians | 2 | | | | | |
| Lane Width (ft) | 16.0 | | | | | |
| Walking Speed (ft/s) | 4.0 | | | | | |
| Percent Blockage | 0 | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | 801 | 747 | |
| pX, platoon unblocked | 0.88 | | | | | |
| vC, conflicting volume | 1268 | 413 | 824 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1025 | 413 | 824 | | | |
| tC, single (s) | 6.9 | 7.0 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 82 | 99 | 99 | | | |
| cM capacity (veh/h) | 197 | 581 | 787 | | | |
| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 | |
| Volume Total | 43 | 295 | 570 | 543 | 279 | |
| Volume Left | 36 | 10 | 0 | 0 | 0 | |
| Volume Right | 8 | 0 | 0 | 0 | 8 | |
| cSH | 223 | 787 | 1700 | 1700 | 1700 | |
| Volume to Capacity | 0.19 | 0.01 | 0.34 | 0.32 | 0.16 | |
| Queue Length 95th (ft) | 18 | 1 | 0 | 0 | 0 | |
| Control Delay (s) | 25.0 | 0.5 | 0.0 | 0.0 | 0.0 | |
| Lane LOS | C | A | | | | |
| Approach Delay (s) | 25.0 | 0.2 | | 0.0 | | |
| Approach LOS | C | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.7 | | | |
| Intersection Capacity Utilization | | | 37.6% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

Existing AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 14 | 4 | 30 | 729 | 445 | 51 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3188 | |
| Flt Permitted | 0.95 | 1.00 | 0.44 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 761 | 3240 | 3188 | |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 16 | 5 | 34 | 838 | 511 | 59 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 16 | 0 | 34 | 838 | 561 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Effective Green, g (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Actuated g/C Ratio | 0.08 | 0.08 | 0.76 | 0.76 | 0.76 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 129 | 103 | 576 | 2456 | 2417 | |
| v/s Ratio Prot | c0.01 | | | c0.26 | 0.18 | |
| v/s Ratio Perm | | 0.00 | 0.04 | | | |
| v/c Ratio | 0.12 | 0.00 | 0.06 | 0.34 | 0.23 | |
| Uniform Delay, d1 | 23.6 | 23.4 | 1.7 | 2.2 | 2.0 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.52 | |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.2 | 0.4 | 0.2 | |
| Delay (s) | 24.0 | 23.4 | 1.9 | 2.5 | 1.2 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.5 | 1.2 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 2.3 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.32 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

Existing PM

HCM Signalized Intersection Capacity Analysis

Existing PM

1: Doolittle Dr & Davis St

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|---------------------|------|-------|-------|------|-------|------|-------|-------|-------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 44 | 82 | 21 | 137 | 72 | 455 | 12 | 330 | 215 | 612 | 741 | 20 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3083 | | 3255 | 1689 | 1493 | 1620 | 4655 | 1435 | 3143 | 3225 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3083 | | 3255 | 1689 | 1493 | 1620 | 4655 | 1435 | 3143 | 3225 | | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | |
| Adj. Flow (vph) | 49 | 92 | 24 | 154 | 81 | 511 | 13 | 371 | 242 | 688 | 833 | 22 | |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 176 | 0 | 0 | 152 | 0 | 1 | 0 | |
| Lane Group Flow (vph) | 49 | 95 | 0 | 154 | 81 | 335 | 13 | 371 | 90 | 688 | 854 | 0 | |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 4.3 | 9.9 | | 8.9 | 14.5 | 36.2 | 4.0 | 19.0 | 27.9 | 21.7 | 36.7 | | |
| Effective Green, g (s) | 4.3 | 9.9 | | 8.9 | 14.5 | 36.2 | 4.0 | 19.0 | 27.9 | 21.7 | 36.7 | | |
| Actuated g/C Ratio | 0.06 | 0.13 | | 0.12 | 0.19 | 0.48 | 0.05 | 0.25 | 0.37 | 0.29 | 0.49 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 96 | 408 | | 387 | 327 | 722 | 86 | 1182 | 535 | 911 | 1582 | | |
| v/s Ratio Prot | c0.03 | 0.03 | | c0.05 | 0.05 | c0.13 | 0.01 | c0.08 | 0.02 | c0.22 | c0.26 | | |
| v/s Ratio Perm | | | | | | 0.09 | | | 0.04 | | | | |
| v/c Ratio | 0.51 | 0.23 | | 0.40 | 0.25 | 0.46 | 0.15 | 0.31 | 0.17 | 0.76 | 0.54 | | |
| Uniform Delay, d1 | 34.2 | 29.1 | | 30.5 | 25.5 | 12.8 | 33.8 | 22.6 | 15.7 | 24.1 | 13.2 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 1.9 | 0.3 | | 0.2 | 0.4 | 0.2 | 0.3 | 0.2 | 0.1 | 3.2 | 0.6 | | |
| Delay (s) | 36.1 | 29.3 | | 30.7 | 25.9 | 13.0 | 34.1 | 22.8 | 15.7 | 27.3 | 13.8 | | |
| Level of Service | D | C | | C | C | B | C | C | B | C | B | | |
| Approach Delay (s) | | 31.4 | | | 18.1 | | | 20.3 | | | 19.8 | | |
| Approach LOS | | C | | | B | | | C | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.1 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.59 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 74.8 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 51.8% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

2: Phillips Ln & Davis St

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|-------|-------|------|------|-------|------|------|
| Lane Configurations | ↰ | ↕ | | ↰ | ↕ | ↗ | ↰ | ↕ | | ↗ | ↕ | ↗ |
| Volume (vph) | 137 | 836 | 18 | 18 | 514 | 412 | 53 | 13 | 270 | 451 | 3 | 128 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | 0.98 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.97 | 0.85 | 1.00 | 0.86 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3168 | | 1620 | 2972 | 1317 | 1651 | 1442 | | 3143 | 1400 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.23 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3168 | | 1620 | 2972 | 1317 | 402 | 1442 | | 3143 | 1400 | |
| Peak-hour factor, PHF | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Adj. Flow (vph) | 138 | 844 | 18 | 18 | 519 | 416 | 54 | 13 | 273 | 456 | 3 | 129 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 17 | 123 | 0 | 201 | 0 | 0 | 100 | 0 |
| Lane Group Flow (vph) | 138 | 861 | 0 | 18 | 631 | 164 | 54 | 85 | 0 | 456 | 32 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 18 | 21 | | | | | 21 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 14.7 | 45.8 | | 5.0 | 36.1 | 60.0 | 17.3 | 17.3 | | 23.9 | 23.9 | |
| Effective Green, g (s) | 14.7 | 45.8 | | 5.0 | 36.1 | 60.0 | 17.3 | 17.3 | | 23.9 | 23.9 | |
| Actuated g/C Ratio | 0.14 | 0.44 | | 0.05 | 0.34 | 0.57 | 0.16 | 0.16 | | 0.23 | 0.23 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 226 | 1381 | | 77 | 1021 | 752 | 66 | 237 | | 715 | 318 | |
| v/s Ratio Prot | c0.09 | c0.27 | | 0.01 | 0.21 | 0.05 | | 0.06 | | c0.15 | | |
| v/s Ratio Perm | | | | | | 0.07 | c0.13 | | | | | 0.02 |
| v/c Ratio | 0.61 | 0.62 | | 0.23 | 0.62 | 0.22 | 0.82 | 0.36 | | 0.64 | 0.10 | |
| Uniform Delay, d1 | 42.5 | 22.9 | | 48.2 | 28.7 | 11.0 | 42.3 | 38.9 | | 36.6 | 32.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.47 | 0.66 | 1.15 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.4 | 2.1 | | 0.5 | 2.5 | 0.1 | 50.1 | 0.3 | | 1.9 | 0.1 | |
| Delay (s) | 45.9 | 25.1 | | 71.4 | 21.3 | 12.9 | 92.4 | 39.3 | | 38.5 | 32.2 | |
| Level of Service | D | C | | E | C | B | F | D | | D | C | |
| Approach Delay (s) | | 27.9 | | | 19.7 | | | 47.7 | | | 37.1 | |
| Approach LOS | | C | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 29.4 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 86.9% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↖ | ↑↑↑ | | ↖↖ | ↑↑ | | | ↑ | ↖↖ | ↖ | ↑ | |
| Volume (vph) | 24 | 1297 | 201 | 345 | 806 | 97 | 129 | 23 | 421 | 64 | 22 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | | 1.00 | 0.99 | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 0.97 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4479 | | 3143 | 3251 | | | 1755 | 2806 | 1562 | 1450 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.72 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4479 | | 3143 | 3251 | | | 1325 | 2806 | 1562 | 1450 | |
| Peak-hour factor, PHF | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Adj. Flow (vph) | 25 | 1351 | 209 | 359 | 840 | 101 | 134 | 24 | 439 | 67 | 23 | 26 |
| RTOR Reduction (vph) | 0 | 17 | 0 | 0 | 7 | 0 | 0 | 0 | 162 | 0 | 24 | 0 |
| Lane Group Flow (vph) | 25 | 1543 | 0 | 359 | 934 | 0 | 0 | 158 | 277 | 67 | 25 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 18 | 21 | | | | | 21 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 5.6 | 49.1 | | 15.8 | 59.8 | | | 17.0 | 32.8 | 9.6 | 9.6 | |
| Effective Green, g (s) | 5.6 | 49.1 | | 15.8 | 59.8 | | | 17.0 | 32.8 | 9.6 | 9.6 | |
| Actuated g/C Ratio | 0.05 | 0.47 | | 0.15 | 0.57 | | | 0.16 | 0.31 | 0.09 | 0.09 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 86 | 2094 | | 472 | 1851 | | | 214 | 876 | 142 | 132 | |
| v/s Ratio Prot | 0.02 | c0.34 | | c0.11 | 0.29 | | | | 0.05 | c0.04 | 0.02 | |
| v/s Ratio Perm | | | | | | | | c0.12 | 0.05 | | | |
| v/c Ratio | 0.29 | 0.74 | | 0.76 | 0.50 | | | 0.74 | 0.32 | 0.47 | 0.19 | |
| Uniform Delay, d1 | 47.8 | 22.7 | | 42.8 | 13.7 | | | 41.9 | 27.5 | 45.3 | 44.1 | |
| Progression Factor | 0.98 | 1.23 | | 1.14 | 0.95 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.6 | 2.0 | | 5.4 | 0.8 | | | 10.9 | 0.1 | 0.9 | 0.3 | |
| Delay (s) | 47.4 | 30.0 | | 54.0 | 13.9 | | | 52.7 | 27.6 | 46.2 | 44.4 | |
| Level of Service | D | C | | D | B | | | D | C | D | D | |
| Approach Delay (s) | | 30.3 | | | 24.9 | | | 34.3 | | | 45.4 | |
| Approach LOS | | C | | | C | | | C | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 29.5 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.71 | C |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 70.0% | 13.5 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | C |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: I-880 SB ramps & Davis St/Davis Street

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|--------|------|-------|------|------|------|------|-------|------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 1167 | 625 | 0 | 885 | 410 | 0 | 0 | 0 | 349 | 0 | 390 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.97 | | 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 | 0.85 | | 0.95 | | | | | 1.00 | 0.91 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1433 | | 3084 | | | | | 1681 | 1479 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1433 | | 3084 | | | | | 1681 | 1479 | 1461 |
| Peak-hour factor, PHF | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Adj. Flow (vph) | 0 | 1179 | 631 | 0 | 894 | 414 | 0 | 0 | 0 | 353 | 0 | 394 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 67 | 67 |
| Lane Group Flow (vph) | 0 | 1179 | 631 | 0 | 1271 | 0 | 0 | 0 | 0 | 261 | 183 | 169 |
| Confl. Peds. (#/hr) | | | 13 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 66.2 | 105.0 | | 66.2 | | | | | 30.8 | 30.8 | 30.8 |
| Effective Green, g (s) | | 66.2 | 105.0 | | 66.2 | | | | | 30.8 | 30.8 | 30.8 |
| Actuated g/C Ratio | | 0.63 | 1.00 | | 0.63 | | | | | 0.29 | 0.29 | 0.29 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2075 | 1433 | | 1944 | | | | | 493 | 433 | 428 |
| v/s Ratio Prot | | 0.36 | | | c0.41 | | | | | c0.16 | 0.12 | 0.12 |
| v/s Ratio Perm | | | 0.44 | | | | | | | | | |
| v/c Ratio | | 0.57 | 0.44 | | 0.65 | | | | | 0.53 | 0.42 | 0.39 |
| Uniform Delay, d1 | | 11.2 | 0.0 | | 12.2 | | | | | 31.0 | 29.9 | 29.6 |
| Progression Factor | | 0.73 | 1.00 | | 0.65 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.9 | 0.2 | | 1.6 | | | | | 1.0 | 0.7 | 0.6 |
| Delay (s) | | 9.0 | 0.2 | | 9.5 | | | | | 32.1 | 30.6 | 30.3 |
| Level of Service | | A | A | | A | | | | | C | C | C |
| Approach Delay (s) | | 5.9 | | | 9.5 | | | 0.0 | | | 31.0 | |
| Approach LOS | | A | | | A | | | A | | | C | |

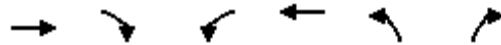
Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 12.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.61 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 60.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

Existing PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↑↑↑ | ↑ |
| Volume (vph) | 1077 | 442 | 0 | 879 | 407 | 539 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Flt | 0.96 | | | 1.00 | 0.94 | 0.85 |
| Flt Protected | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3385 | | | 3539 | 3310 | 1441 |
| Flt Permitted | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3385 | | | 3539 | 3310 | 1441 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 1134 | 465 | 0 | 925 | 428 | 567 |
| RTOR Reduction (vph) | 29 | 0 | 0 | 0 | 48 | 48 |
| Lane Group Flow (vph) | 1570 | 0 | 0 | 925 | 629 | 270 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 71.8 | | | 71.8 | 26.2 | 26.2 |
| Effective Green, g (s) | 71.8 | | | 71.8 | 26.2 | 26.2 |
| Actuated g/C Ratio | 0.68 | | | 0.68 | 0.25 | 0.25 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2314 | | | 2420 | 825 | 359 |
| v/s Ratio Prot | c0.46 | | | 0.26 | c0.19 | 0.19 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.68 | | | 0.38 | 0.76 | 0.75 |
| Uniform Delay, d1 | 9.8 | | | 7.1 | 36.5 | 36.4 |
| Progression Factor | 0.55 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.4 | | | 0.5 | 3.8 | 7.7 |
| Delay (s) | 6.8 | | | 7.6 | 40.3 | 44.1 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 6.8 | | | 7.6 | 41.5 | |
| Approach LOS | A | | | A | D | |






















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 16.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.70 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 72.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

6: Doolittle Dr & Williams St

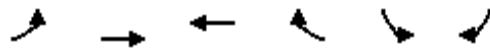
Existing PM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  |  | |
| Volume (vph) | 52 | 82 | 22 | 98 | 72 | 83 | 16 | 347 | 67 | 166 | 819 | 52 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.99 | | |
| Flt Protected | | 0.98 | | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1530 | | | 1682 | 1307 | 1620 | 3003 | | 1562 | 3045 | | |
| Flt Permitted | | 0.84 | | | 0.75 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1314 | | | 1296 | 1307 | 1620 | 3003 | | 1562 | 3045 | | |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | |
| Adj. Flow (vph) | 55 | 87 | 23 | 104 | 77 | 88 | 17 | 369 | 71 | 177 | 871 | 55 | |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 65 | 0 | 21 | 0 | 0 | 5 | 0 | |
| Lane Group Flow (vph) | 0 | 158 | 0 | 0 | 181 | 23 | 17 | 419 | 0 | 177 | 921 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 12 | | | | | 6 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 15.3 | | | 15.3 | 15.3 | 1.3 | 20.0 | | 10.6 | 28.8 | | |
| Effective Green, g (s) | | 15.3 | | | 15.3 | 15.3 | 1.3 | 20.0 | | 10.6 | 28.8 | | |
| Actuated g/C Ratio | | 0.26 | | | 0.26 | 0.26 | 0.02 | 0.34 | | 0.18 | 0.49 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 340 | | | 335 | 338 | 35 | 1016 | | 280 | 1483 | | |
| v/s Ratio Prot | | | | | | | 0.01 | 0.14 | | c0.11 | c0.30 | | |
| v/s Ratio Perm | | 0.12 | | | c0.14 | 0.02 | | | | | | | |
| v/c Ratio | | 0.47 | | | 0.54 | 0.07 | 0.49 | 0.41 | | 0.63 | 0.62 | | |
| Uniform Delay, d1 | | 18.5 | | | 18.9 | 16.5 | 28.6 | 15.0 | | 22.4 | 11.1 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 1.4 | | | 2.2 | 0.1 | 13.8 | 0.4 | | 5.2 | 0.9 | | |
| Delay (s) | | 19.8 | | | 21.1 | 16.6 | 42.3 | 15.4 | | 27.6 | 12.1 | | |
| Level of Service | | B | | | C | B | D | B | | C | B | | |
| Approach Delay (s) | | 19.8 | | | 19.6 | | | 16.4 | | | 14.6 | | |
| Approach LOS | | B | | | B | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 16.1 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.64 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 59.1 | | | | | | | | | Sum of lost time (s) | 13.7 |
| Intersection Capacity Utilization | | | 56.2% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

Existing PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 48 | 411 | 226 | 235 | 246 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.96 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1565 | 1562 | 1345 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1565 | 1562 | 1345 |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 53 | 452 | 248 | 258 | 270 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 103 | 0 | 35 |
| Lane Group Flow (vph) | 53 | 452 | 248 | 155 | 270 | 22 |
| Confl. Peds. (#/hr) | | | | 12 | | 6 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 7.1 | 77.2 | 66.1 | 66.1 | 24.2 | 24.2 |
| Effective Green, g (s) | 7.1 | 77.2 | 66.1 | 66.1 | 24.2 | 24.2 |
| Actuated g/C Ratio | 0.06 | 0.70 | 0.60 | 0.60 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 104 | 1282 | 1024 | 940 | 343 | 295 |
| v/s Ratio Prot | c0.03 | c0.25 | 0.15 | | c0.17 | |
| v/s Ratio Perm | | | | 0.10 | | 0.02 |
| v/c Ratio | 0.51 | 0.35 | 0.24 | 0.16 | 0.79 | 0.07 |
| Uniform Delay, d1 | 49.8 | 6.5 | 10.3 | 9.7 | 40.5 | 34.0 |
| Progression Factor | 1.00 | 1.00 | 1.41 | 3.33 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.4 | 0.8 | 0.5 | 0.4 | 11.3 | 0.1 |
| Delay (s) | 51.2 | 7.3 | 15.0 | 32.7 | 51.8 | 34.1 |
| Level of Service | D | A | B | C | D | C |
| Approach Delay (s) | | 11.9 | 24.0 | | 48.7 | |
| Approach LOS | | B | C | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 25.5 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.48 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 46.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

Existing PM

8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBL | EBT | EBR | WBL | WBT | NBL2 | NBL | NBR | SBL | SBT | SEL | SER |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|
| Lane Configurations | | ↑ | ↗ | ↖ | ↗ | | ↘ | ↗ | | ↕ | ↘ | ↙ |
| Volume (vph) | 2 | 279 | 374 | 127 | 208 | 190 | 8 | 141 | 1 | 8 | 1 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 9 | 10 | 11 | 11 | 16 | 12 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.97 | | 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 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.85 | | 1.00 | 0.88 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | 1759 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | 1757 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 2 | 310 | 416 | 141 | 231 | 211 | 9 | 157 | 1 | 9 | 1 | 9 |
| RTOR Reduction (vph) | 0 | 0 | 219 | 0 | 0 | 0 | 0 | 121 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 312 | 197 | 141 | 231 | 0 | 220 | 36 | 0 | 10 | 10 | 0 |
| Confl. Peds. (#/hr) | | | 14 | | | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | 7 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Turn Type | Perm | NA | Perm | Prot | NA | Prot | Prot | Perm | Split | NA | Prot | |
| Protected Phases | | 2 | | 1 | 6 | 4 | 4 | | 8 | 8 | 7 | |
| Permitted Phases | 2 | | 2 | | | | 4 | | | | | |
| Actuated Green, G (s) | | 52.1 | 52.1 | 14.9 | 71.0 | | 18.6 | 18.6 | | 1.4 | 2.4 | |
| Effective Green, g (s) | | 52.1 | 52.1 | 14.9 | 71.0 | | 18.6 | 18.6 | | 1.4 | 2.4 | |
| Actuated g/C Ratio | | 0.47 | 0.47 | 0.14 | 0.65 | | 0.17 | 0.17 | | 0.01 | 0.02 | |
| Clearance Time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 832 | 682 | 211 | 1100 | | 283 | 288 | | 23 | 34 | |
| v/s Ratio Prot | | | | c0.09 | 0.14 | | c0.13 | | | c0.01 | c0.01 | |
| v/s Ratio Perm | | c0.18 | 0.14 | | | | 0.02 | | | | | |
| v/c Ratio | | 0.38 | 0.29 | 0.67 | 0.21 | | 0.78 | 0.12 | | 0.43 | 0.29 | |
| Uniform Delay, d1 | | 18.5 | 17.7 | 45.2 | 8.0 | | 43.7 | 38.8 | | 53.9 | 53.0 | |
| Progression Factor | | 0.83 | 1.14 | 1.00 | 1.00 | | 0.96 | 0.95 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.2 | 1.0 | 7.8 | 0.4 | | 12.4 | 0.2 | | 12.6 | 4.8 | |
| Delay (s) | | 16.5 | 21.1 | 53.0 | 8.4 | | 54.5 | 37.1 | | 66.5 | 57.7 | |
| Level of Service | | B | C | D | A | | D | D | | E | E | |
| Approach Delay (s) | | 19.1 | | | 25.3 | | | | | 66.5 | 57.7 | |
| Approach LOS | | B | | | C | | | | | E | E | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 28.3 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.51 | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) 20.6 |
| Intersection Capacity Utilization | 76.3% | ICU Level of Service D |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

Existing PM



















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | ↑ | ↗ | ↖ | |
| Volume (veh/h) | 0 | 162 | 243 | 13 | 17 | 4 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Hourly flow rate (vph) | 0 | 182 | 273 | 15 | 19 | 4 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 288 | | | | 455 | 273 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 288 | | | | 455 | 273 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 97 | 99 |
| cM capacity (veh/h) | 1274 | | | | 563 | 766 |

| Direction, Lane # | EB 1 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|
| Volume Total | 182 | 273 | 15 | 24 |
| Volume Left | 0 | 0 | 0 | 19 |
| Volume Right | 0 | 0 | 15 | 4 |
| cSH | 1700 | 1700 | 1700 | 593 |
| Volume to Capacity | 0.11 | 0.16 | 0.01 | 0.04 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 3 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 11.3 |
| Lane LOS | | | | B |
| Approach Delay (s) | 0.0 | 0.0 | | 11.3 |
| Approach LOS | | | | B |

| Intersection Summary | | | |
|-----------------------------------|--|-------|------------------------|
| Average Delay | | 0.5 | |
| Intersection Capacity Utilization | | 22.8% | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

Existing PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 29 | 155 | 12 | 44 | 202 | 47 | 14 | 42 | 29 | 25 | 38 | 20 |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Hourly flow rate (vph) | 35 | 187 | 14 | 53 | 243 | 57 | 17 | 51 | 35 | 30 | 46 | 24 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 236 | 353 | 102 | 100 | | | | | | | | |
| Volume Left (vph) | 35 | 53 | 17 | 30 | | | | | | | | |
| Volume Right (vph) | 14 | 57 | 35 | 24 | | | | | | | | |
| Hadj (s) | 0.03 | -0.03 | -0.14 | -0.05 | | | | | | | | |
| Departure Headway (s) | 5.0 | 4.8 | 5.4 | 5.5 | | | | | | | | |
| Degree Utilization, x | 0.33 | 0.47 | 0.15 | 0.15 | | | | | | | | |
| Capacity (veh/h) | 683 | 725 | 585 | 580 | | | | | | | | |
| Control Delay (s) | 10.3 | 11.9 | 9.4 | 9.5 | | | | | | | | |
| Approach Delay (s) | 10.3 | 11.9 | 9.4 | 9.5 | | | | | | | | |
| Approach LOS | B | B | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.8 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 36.0% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

Existing PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 41 | 169 | 30 | 222 | 236 | 123 | 16 | 272 | 172 | 258 | 686 | 90 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1447 | 1620 | 1739 | 1401 | 1652 | 3240 | 1351 | 1620 | 3021 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1447 | 1620 | 1739 | 1401 | 1652 | 3240 | 1351 | 1620 | 3021 | |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 47 | 194 | 34 | 255 | 271 | 141 | 18 | 313 | 198 | 297 | 789 | 103 |
| RTOR Reduction (vph) | 0 | 0 | 28 | 0 | 0 | 96 | 0 | 0 | 159 | 0 | 7 | 0 |
| Lane Group Flow (vph) | 47 | 194 | 6 | 255 | 271 | 45 | 18 | 313 | 39 | 297 | 885 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 12 | | | | | 6 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 7.9 | 19.4 | 19.4 | 22.5 | 34.0 | 34.0 | 3.1 | 20.9 | 20.9 | 25.2 | 43.0 | |
| Effective Green, g (s) | 7.9 | 19.4 | 19.4 | 22.5 | 34.0 | 34.0 | 3.1 | 20.9 | 20.9 | 25.2 | 43.0 | |
| Actuated g/C Ratio | 0.07 | 0.18 | 0.18 | 0.21 | 0.32 | 0.32 | 0.03 | 0.20 | 0.20 | 0.24 | 0.41 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 123 | 318 | 264 | 343 | 557 | 449 | 48 | 638 | 266 | 385 | 1225 | |
| v/s Ratio Prot | 0.03 | c0.11 | | c0.16 | 0.16 | | 0.01 | 0.10 | | c0.18 | c0.29 | |
| v/s Ratio Perm | | | 0.00 | | | 0.03 | | | 0.03 | | | |
| v/c Ratio | 0.38 | 0.61 | 0.02 | 0.74 | 0.49 | 0.10 | 0.38 | 0.49 | 0.15 | 0.77 | 0.72 | |
| Uniform Delay, d1 | 46.7 | 39.8 | 35.5 | 39.1 | 29.0 | 25.3 | 50.5 | 37.8 | 35.2 | 37.7 | 26.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.7 | 3.9 | 0.0 | 9.0 | 0.9 | 0.1 | 6.6 | 0.8 | 0.3 | 9.8 | 2.3 | |
| Delay (s) | 49.4 | 43.8 | 35.6 | 48.0 | 29.9 | 25.4 | 57.1 | 38.6 | 35.5 | 47.5 | 28.8 | |
| Level of Service | D | D | D | D | C | C | E | D | D | D | C | |
| Approach Delay (s) | | 43.7 | | | 35.9 | | | 38.1 | | | 33.4 | |
| Approach LOS | | D | | | D | | | D | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 36.0 | | | | HCM 2000 Level of Service | | | D | | |
| HCM 2000 Volume to Capacity ratio | | | 0.74 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 106.0 | | | | Sum of lost time (s) | | 18.0 | | | |
| Intersection Capacity Utilization | | | 62.1% | | | | ICU Level of Service | | B | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|-------|------|------|------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 52 | 694 | 43 | 428 | 577 | 134 | 43 | 185 | 535 | 323 | 206 | 38 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4608 | | 3255 | 3139 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1462 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4608 | | 3255 | 3139 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1462 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 55 | 731 | 45 | 451 | 607 | 141 | 45 | 195 | 563 | 340 | 217 | 40 |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| Lane Group Flow (vph) | 55 | 770 | 0 | 451 | 730 | 0 | 45 | 195 | 563 | 340 | 217 | 9 |
| Confl. Peds. (#/hr) | | | 8 | | | 2 | | | | | | 7 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 6.9 | 21.5 | | 24.0 | 38.6 | | 22.5 | 25.5 | 49.5 | 20.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 6.9 | 23.0 | | 24.0 | 40.1 | | 22.5 | 27.0 | 49.5 | 20.0 | 24.5 | 24.5 |
| Actuated g/C Ratio | 0.06 | 0.21 | | 0.22 | 0.36 | | 0.20 | 0.25 | 0.45 | 0.18 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 97 | 963 | | 710 | 1144 | | 343 | 823 | 1217 | 591 | 721 | 325 |
| v/s Ratio Prot | 0.04 | c0.17 | | 0.14 | c0.23 | | 0.03 | 0.06 | c0.21 | c0.10 | 0.07 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 |
| v/c Ratio | 0.57 | 0.80 | | 0.64 | 0.64 | | 0.13 | 0.24 | 0.46 | 0.58 | 0.30 | 0.03 |
| Uniform Delay, d1 | 50.1 | 41.3 | | 39.0 | 28.9 | | 35.8 | 33.2 | 21.0 | 41.1 | 35.6 | 33.4 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.34 | 1.28 | 1.50 | 0.99 | 0.99 | 1.00 |
| Incremental Delay, d2 | 8.9 | 6.9 | | 4.3 | 2.7 | | 0.8 | 0.2 | 0.4 | 4.0 | 0.3 | 0.0 |
| Delay (s) | 59.0 | 48.2 | | 43.3 | 31.6 | | 48.7 | 42.7 | 31.9 | 44.5 | 35.5 | 33.5 |
| Level of Service | E | D | | D | C | | D | D | C | D | D | C |
| Approach Delay (s) | | 48.9 | | | 36.0 | | | 35.5 | | | 40.5 | |
| Approach LOS | | D | | | D | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 39.8 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.63 | D |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 65.5% | 17.5 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | C |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Existing PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | | ↑↑↑ | | ↗ |
| Volume (veh/h) | 1552 | 0 | 0 | 1162 | 0 | 0 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1687 | 0 | 0 | 1263 | 0 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | | | |
| pX, platoon unblocked | | | 0.90 | 0.90 | 0.90 | |
| vC, conflicting volume | | | 1687 | 2108 | 422 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 1185 | 1655 | 0 | |
| tC, single (s) | | | 4.1 | 6.8 | 6.9 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | 3.5 | 3.3 | |
| p0 queue free % | | | 100 | 100 | 100 | |
| cM capacity (veh/h) | | | 524 | 80 | 971 | |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total | 482 | 482 | 482 | 241 | 421 | 421 | 421 | 0 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.28 | 0.28 | 0.28 | 0.14 | 0.25 | 0.25 | 0.25 | 0.00 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | | | | | | | | A |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | 0.0 |
| Approach LOS | | | | | | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | | 0.0 | |
| Intersection Capacity Utilization | 25.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Unsignalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Existing PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | ↙ | ↑↑ | | ↙ |
| Volume (veh/h) | 915 | 0 | 408 | 697 | 0 | 445 |
| Sign Control | Free | | Free | | Yield | |
| Grade | 0% | | 0% | | 0% | |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Hourly flow rate (vph) | 984 | 0 | 439 | 749 | 0 | 478 |
| Pedestrians | | | 13 | | | |
| Lane Width (ft) | | | 10.7 | | | |
| Walking Speed (ft/s) | | | 4.0 | | | |
| Percent Blockage | | | 1 | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 930 | | | | | |
| pX, platoon unblocked | | | 0.90 | 0.90 | 0.90 | 0.90 |
| vC, conflicting volume | | | 984 | 2236 | 505 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 754 | 2149 | 221 | |
| tC, single (s) | | | 4.2 | 6.8 | 7.0 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | 3.5 | 3.3 | |
| p0 queue free % | | | 42 | 100 | 31 | |
| cM capacity (veh/h) | | | 753 | 15 | 691 | |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|
| Volume Total | 492 | 492 | 439 | 375 | 375 | 478 |
| Volume Left | 0 | 0 | 439 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 478 |
| cSH | 1700 | 1700 | 753 | 1700 | 1700 | 691 |
| Volume to Capacity | 0.29 | 0.29 | 0.58 | 0.22 | 0.22 | 0.69 |
| Queue Length 95th (ft) | 0 | 0 | 95 | 0 | 0 | 140 |
| Control Delay (s) | 0.0 | 0.0 | 16.2 | 0.0 | 0.0 | 21.1 |
| Lane LOS | | | C | | | C |
| Approach Delay (s) | 0.0 | | 6.0 | | | 21.1 |
| Approach LOS | | | | | | C |

| Intersection Summary | | | | | | |
|-----------------------------------|--|--|-------|----------------------|---|--|
| Average Delay | | | 6.5 | | | |
| Intersection Capacity Utilization | | | 64.7% | ICU Level of Service | C | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

Existing PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|-------|------|
| Lane Configurations | ↵ | ↑↑↑ | ↑↑ | | | ↵ |
| Volume (veh/h) | 472 | 1411 | 678 | 0 | 0 | 456 |
| Sign Control | | Free | Free | | Yield | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Hourly flow rate (vph) | 487 | 1455 | 699 | 0 | 0 | 470 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | 841 | | | |
| pX, platoon unblocked | 0.96 | | | | 0.96 | 0.96 |
| vC, conflicting volume | 699 | | | | 2157 | 349 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 604 | | | | 2122 | 240 |
| tC, single (s) | 4.2 | | | | 6.8 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 47 | | | | 100 | 35 |
| cM capacity (veh/h) | 918 | | | | 19 | 725 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 487 | 485 | 485 | 485 | 349 | 349 | 470 |
| Volume Left | 487 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 470 |
| cSH | 918 | 1700 | 1700 | 1700 | 1700 | 1700 | 725 |
| Volume to Capacity | 0.53 | 0.29 | 0.29 | 0.29 | 0.21 | 0.21 | 0.65 |
| Queue Length 95th (ft) | 80 | 0 | 0 | 0 | 0 | 0 | 120 |
| Control Delay (s) | 13.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.6 |
| Lane LOS | B | | | | | | C |
| Approach Delay (s) | 3.3 | | | | 0.0 | | 18.6 |
| Approach LOS | | | | | | | C |

| Intersection Summary | | | | | | | |
|-----------------------------------|--|--|-------|--|----------------------|--|---|
| Average Delay | | | 4.9 | | | | |
| Intersection Capacity Utilization | | | 53.6% | | ICU Level of Service | | A |
| Analysis Period (min) | | | 15 | | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

Existing PM


























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|-------|-------|------|
| Lane Configurations | ↘ | ↑↑↑ | ↗ | ↘ | ↑↑↑ | | ↘ | ↗ | ↗ | | ↗ | ↗ |
| Volume (vph) | 178 | 892 | 258 | 151 | 655 | 19 | 365 | 23 | 101 | 15 | 48 | 57 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1529 | 1678 | 4632 | | 1539 | 1551 | 1508 | | 1745 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1529 | 1678 | 4632 | | 1539 | 1551 | 1508 | | 1745 | 1489 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 189 | 949 | 274 | 161 | 697 | 20 | 388 | 24 | 107 | 16 | 51 | 61 |
| RTOR Reduction (vph) | 0 | 0 | 171 | 0 | 3 | 0 | 0 | 0 | 85 | 0 | 0 | 56 |
| Lane Group Flow (vph) | 189 | 949 | 103 | 161 | 714 | 0 | 206 | 206 | 22 | 0 | 67 | 5 |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 16.8 | 37.7 | 37.7 | 14.6 | 35.5 | | 20.6 | 20.6 | 20.6 | | 7.9 | 7.9 |
| Effective Green, g (s) | 16.8 | 37.7 | 37.7 | 14.6 | 35.5 | | 20.6 | 20.6 | 20.6 | | 7.9 | 7.9 |
| Actuated g/C Ratio | 0.17 | 0.38 | 0.38 | 0.15 | 0.36 | | 0.21 | 0.21 | 0.21 | | 0.08 | 0.08 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 272 | 1754 | 576 | 244 | 1644 | | 317 | 319 | 310 | | 137 | 117 |
| v/s Ratio Prot | c0.12 | c0.20 | | 0.10 | 0.15 | | c0.13 | 0.13 | | | c0.04 | 0.00 |
| v/s Ratio Perm | | | 0.07 | | | | | | 0.01 | | | |
| v/c Ratio | 0.69 | 0.54 | 0.18 | 0.66 | 0.43 | | 0.65 | 0.65 | 0.07 | | 0.49 | 0.04 |
| Uniform Delay, d1 | 39.2 | 24.4 | 20.8 | 40.4 | 24.6 | | 36.4 | 36.4 | 32.0 | | 44.1 | 42.6 |
| Progression Factor | 0.99 | 0.98 | 0.52 | 0.80 | 1.21 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 8.1 | 1.2 | 0.7 | 6.8 | 0.8 | | 5.1 | 4.9 | 0.1 | | 3.7 | 0.2 |
| Delay (s) | 47.0 | 25.0 | 11.5 | 39.2 | 30.6 | | 41.5 | 41.3 | 32.1 | | 47.8 | 42.7 |
| Level of Service | D | C | B | D | C | | D | D | C | | D | D |
| Approach Delay (s) | | 25.3 | | | 32.2 | | | 39.5 | | | 45.4 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 30.7 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.61 | C |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 59.3% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | B |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

Existing PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  | |  |  |  |  |  |  |
| Volume (vph) | 62 | 755 | 94 | 90 | 477 | 19 | 154 | 125 | 196 | 30 | 115 | 74 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1463 | 1652 | 3268 | | 3143 | 1705 | 1658 | 3204 | 3019 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1463 | 1652 | 3268 | | 3143 | 1705 | 1658 | 3204 | 3019 | |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 65 | 795 | 99 | 95 | 502 | 20 | 162 | 132 | 206 | 32 | 121 | 78 |
| RTOR Reduction (vph) | 0 | 0 | 52 | 0 | 2 | 0 | 0 | 0 | 166 | 0 | 68 | 0 |
| Lane Group Flow (vph) | 65 | 795 | 47 | 95 | 520 | 0 | 162 | 132 | 40 | 32 | 131 | 0 |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 7.5 | 47.6 | 47.6 | 10.1 | 50.2 | | 11.3 | 19.5 | 19.5 | 4.8 | 13.4 | |
| Effective Green, g (s) | 7.5 | 47.6 | 47.6 | 10.1 | 50.2 | | 11.3 | 19.5 | 19.5 | 4.8 | 13.4 | |
| Actuated g/C Ratio | 0.08 | 0.48 | 0.48 | 0.10 | 0.50 | | 0.11 | 0.20 | 0.20 | 0.05 | 0.13 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 121 | 1572 | 696 | 166 | 1640 | | 355 | 332 | 323 | 153 | 404 | |
| v/s Ratio Prot | 0.04 | c0.24 | | c0.06 | c0.16 | | c0.05 | c0.08 | | 0.01 | 0.04 | |
| v/s Ratio Perm | | | 0.03 | | | | | | 0.02 | | | |
| v/c Ratio | 0.54 | 0.51 | 0.07 | 0.57 | 0.32 | | 0.46 | 0.40 | 0.12 | 0.21 | 0.33 | |
| Uniform Delay, d1 | 44.6 | 18.1 | 14.2 | 42.9 | 14.7 | | 41.5 | 35.1 | 33.2 | 45.8 | 39.2 | |
| Progression Factor | 1.43 | 0.21 | 0.00 | 1.24 | 0.77 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.0 | 1.0 | 0.2 | 3.5 | 0.3 | | 1.3 | 1.1 | 0.2 | 0.9 | 0.6 | |
| Delay (s) | 65.8 | 4.8 | 0.2 | 56.6 | 11.7 | | 42.7 | 36.2 | 33.4 | 46.7 | 39.9 | |
| Level of Service | E | A | A | E | B | | D | D | C | D | D | |
| Approach Delay (s) | | 8.4 | | | 18.6 | | | 37.2 | | | 40.8 | |
| Approach LOS | | A | | | B | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.6 | | | | HCM 2000 Level of Service | | | C | | |
| HCM 2000 Volume to Capacity ratio | | | 0.49 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | | | Sum of lost time (s) | | | 18.0 | | |
| Intersection Capacity Utilization | | | 53.3% | | | | ICU Level of Service | | | A | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

18: San Leandro Blvd & Marina Blvd

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|-------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 265 | 393 | 310 | 3 | 168 | 14 | 215 | 439 | 14 | 51 | 670 | 228 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1647 | 1739 | 1770 | | 1737 | 1480 | 1652 | 3523 | | 1652 | 3161 | |
| Flt Permitted | 0.35 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 604 | 1739 | 1770 | | 1725 | 1480 | 1652 | 3523 | | 1652 | 3161 | |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 282 | 418 | 330 | 3 | 179 | 15 | 229 | 467 | 15 | 54 | 713 | 243 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 2 | 0 | 0 | 30 | 0 |
| Lane Group Flow (vph) | 282 | 418 | 330 | 0 | 182 | 2 | 229 | 480 | 0 | 54 | 926 | 0 |
| Confl. Peds. (#/hr) | 12 | | | | | | 12 | | | | | 6 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 37.8 | 37.8 | 100.0 | | 16.5 | 16.5 | 17.5 | 40.4 | | 7.3 | 29.7 | |
| Effective Green, g (s) | 37.8 | 37.8 | 100.0 | | 16.5 | 16.5 | 17.5 | 40.4 | | 7.3 | 29.7 | |
| Actuated g/C Ratio | 0.38 | 0.38 | 1.00 | | 0.16 | 0.16 | 0.18 | 0.40 | | 0.07 | 0.30 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 408 | 657 | 1770 | | 284 | 244 | 289 | 1423 | | 120 | 938 | |
| v/s Ratio Prot | c0.12 | 0.24 | | | | | c0.14 | 0.14 | | 0.03 | c0.29 | |
| v/s Ratio Perm | c0.14 | | 0.19 | | 0.11 | 0.00 | | | | | | |
| v/c Ratio | 0.69 | 0.64 | 0.19 | | 0.64 | 0.01 | 0.79 | 0.34 | | 0.45 | 0.99 | |
| Uniform Delay, d1 | 23.9 | 25.5 | 0.0 | | 39.0 | 34.9 | 39.5 | 20.6 | | 44.4 | 35.0 | |
| Progression Factor | 0.63 | 0.70 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.6 | 2.1 | 0.2 | | 5.4 | 0.0 | 13.8 | 0.6 | | 2.7 | 26.4 | |
| Delay (s) | 19.5 | 19.8 | 0.2 | | 44.4 | 34.9 | 53.3 | 21.2 | | 47.1 | 61.4 | |
| Level of Service | B | B | A | | D | C | D | C | | D | E | |
| Approach Delay (s) | | 13.4 | | | 43.7 | | | 31.5 | | | 60.6 | |
| Approach LOS | | B | | | D | | | C | | | E | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 36.0 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.84 | D |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 87.4% | 19.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | E |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

Existing PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 57 | 26 | 37 | 82 | 149 | 54 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Hourly flow rate (vph) | 66 | 30 | 43 | 94 | 171 | 62 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 95 | 137 | 233 | | | |
| Volume Left (vph) | 66 | 43 | 0 | | | |
| Volume Right (vph) | 30 | 0 | 62 | | | |
| Hadj (s) | -0.02 | 0.10 | -0.13 | | | |
| Departure Headway (s) | 4.7 | 4.5 | 4.2 | | | |
| Degree Utilization, x | 0.12 | 0.17 | 0.27 | | | |
| Capacity (veh/h) | 706 | 774 | 833 | | | |
| Control Delay (s) | 8.4 | 8.4 | 8.7 | | | |
| Approach Delay (s) | 8.4 | 8.4 | 8.7 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.5 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 32.2% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

Existing PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 9 | 4 | 6 | 108 | 107 | 19 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Hourly flow rate (vph) | 11 | 5 | 7 | 129 | 127 | 23 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 15 | 136 | 150 | | | |
| Volume Left (vph) | 11 | 7 | 0 | | | |
| Volume Right (vph) | 5 | 0 | 23 | | | |
| Hadj (s) | -0.01 | 0.04 | -0.06 | | | |
| Departure Headway (s) | 4.5 | 4.1 | 4.0 | | | |
| Degree Utilization, x | 0.02 | 0.16 | 0.17 | | | |
| Capacity (veh/h) | 741 | 855 | 886 | | | |
| Control Delay (s) | 7.6 | 7.9 | 7.8 | | | |
| Approach Delay (s) | 7.6 | 7.9 | 7.8 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.8 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 20.6% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Signalized Intersection Capacity Analysis

21: Monarch Bay Drive & Fairway Drive

Existing PM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Volume (vph) | 38 | 55 | 63 | 62 | 39 | 71 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Util. Factor | 1.00 | | 1.00 | | | 1.00 |
| Frt | 0.92 | | 0.93 | | | 1.00 |
| Flt Protected | 0.98 | | 1.00 | | | 0.98 |
| Satd. Flow (prot) | 1680 | | 1738 | | | 1831 |
| Flt Permitted | 0.98 | | 1.00 | | | 0.88 |
| Satd. Flow (perm) | 1680 | | 1738 | | | 1631 |
| Peak-hour factor, PHF | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Adj. Flow (vph) | 45 | 65 | 75 | 74 | 46 | 85 |
| RTOR Reduction (vph) | 39 | 0 | 44 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 71 | 0 | 105 | 0 | 0 | 131 |
| Turn Type | Prot | | NA | | Perm | NA |
| Protected Phases | 8 | | 2 | | | 6 |
| Permitted Phases | | | | | 6 | |
| Actuated Green, G (s) | 18.0 | | 18.0 | | | 18.0 |
| Effective Green, g (s) | 18.0 | | 18.0 | | | 18.0 |
| Actuated g/C Ratio | 0.40 | | 0.40 | | | 0.40 |
| Clearance Time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Grp Cap (vph) | 672 | | 695 | | | 652 |
| v/s Ratio Prot | c0.04 | | 0.06 | | | |
| v/s Ratio Perm | | | | | | c0.08 |
| v/c Ratio | 0.11 | | 0.15 | | | 0.20 |
| Uniform Delay, d1 | 8.5 | | 8.6 | | | 8.8 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.3 | | 0.5 | | | 0.7 |
| Delay (s) | 8.8 | | 9.1 | | | 9.5 |
| Level of Service | A | | A | | | A |
| Approach Delay (s) | 8.8 | | 9.1 | | | 9.5 |
| Approach LOS | A | | A | | | A |



















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 9.1 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.15 | | |
| Actuated Cycle Length (s) | 45.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 29.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Existing PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 8 | 104 | 12 | 31 | 125 | 39 | 10 | 21 | 22 | 35 | 24 | 23 |
| 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 |
| Hourly flow rate (vph) | 9 | 113 | 13 | 34 | 136 | 42 | 11 | 23 | 24 | 38 | 26 | 25 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 9 | 126 | 212 | 58 | 89 | | | | | | | |
| Volume Left (vph) | 9 | 0 | 34 | 11 | 38 | | | | | | | |
| Volume Right (vph) | 0 | 13 | 42 | 24 | 25 | | | | | | | |
| Hadj (s) | 0.53 | -0.04 | -0.05 | -0.18 | -0.05 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.0 | 4.5 | 4.7 | 4.7 | | | | | | | |
| Degree Utilization, x | 0.01 | 0.18 | 0.26 | 0.07 | 0.12 | | | | | | | |
| Capacity (veh/h) | 623 | 689 | 769 | 710 | 698 | | | | | | | |
| Control Delay (s) | 7.5 | 7.9 | 9.1 | 8.0 | 8.4 | | | | | | | |
| Approach Delay (s) | 7.8 | | 9.1 | 8.0 | 8.4 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.5 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 33.2% | | ICU Level of Service | | A | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 39 | 97 | 61 | 53 | 83 | 115 | 44 | 287 | 40 | 184 | 588 | 70 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.98 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1711 | 1256 | 1620 | 1739 | 1316 | 1711 | 3021 | | 1620 | 3026 | |
| Flt Permitted | | 0.87 | 1.00 | 0.66 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1514 | 1256 | 1128 | 1739 | 1316 | 1711 | 3021 | | 1620 | 3026 | |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 43 | 107 | 67 | 58 | 91 | 126 | 48 | 315 | 44 | 202 | 646 | 77 |
| RTOR Reduction (vph) | 0 | 0 | 55 | 0 | 0 | 103 | 0 | 14 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 0 | 150 | 12 | 58 | 91 | 23 | 48 | 345 | 0 | 202 | 714 | 0 |
| Confl. Peds. (#/hr) | 12 | | | | | 12 | | | | | | 6 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 9.9 | 9.9 | 9.9 | 9.9 | 9.9 | 2.8 | 20.9 | | 9.5 | 27.6 | |
| Effective Green, g (s) | | 9.9 | 9.9 | 9.9 | 9.9 | 9.9 | 2.8 | 20.9 | | 9.5 | 27.6 | |
| Actuated g/C Ratio | | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.05 | 0.38 | | 0.17 | 0.50 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 271 | 224 | 201 | 311 | 235 | 86 | 1141 | | 278 | 1510 | |
| v/s Ratio Prot | | | | | 0.05 | | 0.03 | 0.11 | | c0.12 | c0.24 | |
| v/s Ratio Perm | | c0.10 | 0.01 | 0.05 | | 0.02 | | | | | | |
| v/c Ratio | | 0.55 | 0.05 | 0.29 | 0.29 | 0.10 | 0.56 | 0.30 | | 0.73 | 0.47 | |
| Uniform Delay, d1 | | 20.7 | 18.8 | 19.7 | 19.7 | 19.0 | 25.6 | 12.1 | | 21.7 | 9.1 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 2.4 | 0.1 | 0.8 | 0.5 | 0.2 | 7.6 | 0.2 | | 9.1 | 0.3 | |
| Delay (s) | | 23.1 | 18.9 | 20.4 | 20.2 | 19.1 | 33.3 | 12.3 | | 30.8 | 9.4 | |
| Level of Service | | C | B | C | C | B | C | B | | C | A | |
| Approach Delay (s) | | 21.8 | | | 19.8 | | | 14.8 | | | 14.1 | |
| Approach LOS | | C | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.58 | | |
| Actuated Cycle Length (s) | 55.3 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 48.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|-------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 150 | 186 | 103 | 79 | 131 | 44 | 66 | 376 | 70 | 62 | 472 | 66 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1593 | 1863 | 1310 | 1593 | 1863 | 1372 | 1652 | 3159 | | 1593 | 3147 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1593 | 1863 | 1310 | 1593 | 1863 | 1372 | 1652 | 3159 | | 1593 | 3147 | |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 165 | 204 | 113 | 87 | 144 | 48 | 73 | 413 | 77 | 68 | 519 | 73 |
| RTOR Reduction (vph) | 0 | 0 | 90 | 0 | 0 | 39 | 0 | 13 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 165 | 204 | 23 | 87 | 144 | 9 | 73 | 477 | 0 | 68 | 583 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | 3 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 17.0 | 22.5 | 22.5 | 15.3 | 20.8 | 20.8 | 7.9 | 43.9 | | 9.3 | 45.3 | |
| Effective Green, g (s) | 17.0 | 22.5 | 22.5 | 15.3 | 20.8 | 20.8 | 7.9 | 43.9 | | 9.3 | 45.3 | |
| Actuated g/C Ratio | 0.15 | 0.20 | 0.20 | 0.14 | 0.19 | 0.19 | 0.07 | 0.40 | | 0.08 | 0.41 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 246 | 381 | 267 | 221 | 352 | 259 | 118 | 1260 | | 134 | 1295 | |
| v/s Ratio Prot | c0.10 | c0.11 | | 0.05 | c0.08 | | c0.04 | 0.15 | | 0.04 | c0.19 | |
| v/s Ratio Perm | | | 0.02 | | | 0.01 | | | | | | |
| v/c Ratio | 0.67 | 0.54 | 0.09 | 0.39 | 0.41 | 0.04 | 0.62 | 0.38 | | 0.51 | 0.45 | |
| Uniform Delay, d1 | 43.9 | 39.1 | 35.4 | 43.1 | 39.2 | 36.4 | 49.6 | 23.4 | | 48.2 | 23.4 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.03 | 1.06 | | 0.75 | 0.51 | |
| Incremental Delay, d2 | 7.6 | 1.8 | 0.2 | 1.6 | 1.1 | 0.1 | 10.5 | 0.9 | | 4.0 | 1.1 | |
| Delay (s) | 51.5 | 40.9 | 35.6 | 44.7 | 40.3 | 36.5 | 61.6 | 25.6 | | 40.1 | 12.9 | |
| Level of Service | D | D | D | D | D | D | E | C | | D | B | |
| Approach Delay (s) | | 43.3 | | | 41.0 | | | 30.3 | | | 15.7 | |
| Approach LOS | | D | | | D | | | C | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 30.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.50 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 61.1% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 1 | 266 | 3 | 6 | 263 | 0 | 10 | 0 | 7 | 10 | 0 | 3 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 1.00 | | | 0.94 | | | 0.97 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.97 | | | 0.96 | |
| Satd. Flow (prot) | 1770 | 1860 | | | 3535 | | | 1707 | | | 1740 | |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | 1770 | 1860 | | | 3358 | | | 1757 | | | 1809 | |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 1 | 292 | 3 | 7 | 289 | 0 | 11 | 0 | 8 | 11 | 0 | 3 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 1 | 295 | 0 | 0 | 296 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 0.5 | 33.0 | | | 27.6 | | | 2.8 | | | 2.8 | |
| Effective Green, g (s) | 0.5 | 33.0 | | | 27.6 | | | 2.8 | | | 2.8 | |
| Actuated g/C Ratio | 0.01 | 0.74 | | | 0.62 | | | 0.06 | | | 0.06 | |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Grp Cap (vph) | 19 | 1373 | | | 2073 | | | 110 | | | 113 | |
| v/s Ratio Prot | 0.00 | c0.16 | | | | | | | | | | |
| v/s Ratio Perm | | | | | 0.09 | | | c0.00 | | | 0.00 | |
| v/c Ratio | 0.05 | 0.21 | | | 0.14 | | | 0.01 | | | 0.01 | |
| Uniform Delay, d1 | 21.9 | 1.8 | | | 3.6 | | | 19.7 | | | 19.6 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 0.4 | 0.1 | | | 0.0 | | | 0.1 | | | 0.0 | |
| Delay (s) | 22.3 | 1.9 | | | 3.6 | | | 19.7 | | | 19.7 | |
| Level of Service | C | A | | | A | | | B | | | B | |
| Approach Delay (s) | | 2.0 | | | 3.6 | | | 19.7 | | | 19.7 | |
| Approach LOS | | A | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 3.7 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.23 | | |
| Actuated Cycle Length (s) | 44.7 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 24.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

26: Miller St & Fairway Dr/Aladdin Ave

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 4 | 447 | 13 | 18 | 297 | 0 | 68 | 0 | 56 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | | | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 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 | | 1.00 | 1.00 | | 1.00 | 0.85 | | | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | | | |
| Satd. Flow (prot) | 1770 | 1854 | | 1593 | 1987 | | 1711 | 1531 | | | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.76 | 1.00 | | | | |
| Satd. Flow (perm) | 1770 | 1854 | | 1593 | 1987 | | 1363 | 1531 | | | | |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 5 | 514 | 15 | 21 | 341 | 0 | 78 | 0 | 64 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 5 | 528 | 0 | 21 | 341 | 0 | 78 | 11 | 0 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 0.7 | 30.8 | | 0.9 | 31.0 | | 9.7 | 9.7 | | | | |
| Effective Green, g (s) | 0.7 | 30.8 | | 0.9 | 31.0 | | 9.7 | 9.7 | | | | |
| Actuated g/C Ratio | 0.01 | 0.56 | | 0.02 | 0.56 | | 0.18 | 0.18 | | | | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | | | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | | | |
| Lane Grp Cap (vph) | 22 | 1034 | | 25 | 1115 | | 239 | 269 | | | | |
| v/s Ratio Prot | 0.00 | c0.28 | | c0.01 | 0.17 | | | 0.01 | | | | |
| v/s Ratio Perm | | | | | | | c0.06 | | | | | |
| v/c Ratio | 0.23 | 0.51 | | 0.84 | 0.31 | | 0.33 | 0.04 | | | | |
| Uniform Delay, d1 | 27.0 | 7.5 | | 27.1 | 6.4 | | 19.9 | 18.9 | | | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | | | |
| Incremental Delay, d2 | 1.9 | 0.6 | | 106.1 | 0.2 | | 1.1 | 0.1 | | | | |
| Delay (s) | 28.9 | 8.1 | | 133.1 | 6.6 | | 21.0 | 19.0 | | | | |
| Level of Service | C | A | | F | A | | C | B | | | | |
| Approach Delay (s) | | 8.3 | | | 14.0 | | | 20.1 | | | 0.0 | |
| Approach LOS | | A | | | B | | | C | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 11.9 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.52 | | |
| Actuated Cycle Length (s) | 55.2 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 35.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Teagarden St & Aladdin Ave

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | |
| Volume (vph) | 100 | 188 | 105 | 2 | 115 | 64 | 37 | 101 | 11 | 36 | 204 | 90 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.99 | | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1906 | | 1711 | 1609 | | 1652 | 1831 | | 1644 | 1813 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.44 | 1.00 | | 0.68 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1906 | | 1711 | 1609 | | 764 | 1831 | | 1173 | 1813 | |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 110 | 207 | 115 | 2 | 126 | 70 | 41 | 111 | 12 | 40 | 224 | 99 |
| RTOR Reduction (vph) | 0 | 27 | 0 | 0 | 30 | 0 | 0 | 6 | 0 | 0 | 23 | 0 |
| Lane Group Flow (vph) | 110 | 295 | 0 | 2 | 166 | 0 | 41 | 117 | 0 | 40 | 301 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 12 | | 6 | 6 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 7.8 | 22.1 | | 0.9 | 15.2 | | 15.2 | 15.2 | | 15.2 | 15.2 | |
| Effective Green, g (s) | 7.8 | 22.1 | | 0.9 | 15.2 | | 15.2 | 15.2 | | 15.2 | 15.2 | |
| Actuated g/C Ratio | 0.15 | 0.43 | | 0.02 | 0.30 | | 0.30 | 0.30 | | 0.30 | 0.30 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 260 | 822 | | 30 | 477 | | 226 | 543 | | 348 | 538 | |
| v/s Ratio Prot | c0.06 | c0.15 | | 0.00 | 0.10 | | | 0.06 | | | c0.17 | |
| v/s Ratio Perm | | | | | | | 0.05 | | | 0.03 | | |
| v/c Ratio | 0.42 | 0.36 | | 0.07 | 0.35 | | 0.18 | 0.22 | | 0.11 | 0.56 | |
| Uniform Delay, d1 | 19.7 | 9.8 | | 24.7 | 14.1 | | 13.4 | 13.5 | | 13.1 | 15.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.5 | 0.4 | | 1.3 | 0.6 | | 0.5 | 0.3 | | 0.2 | 1.6 | |
| Delay (s) | 21.2 | 10.2 | | 26.0 | 14.7 | | 13.9 | 13.8 | | 13.3 | 16.7 | |
| Level of Service | C | B | | C | B | | B | B | | B | B | |
| Approach Delay (s) | | 13.0 | | | 14.8 | | | 13.8 | | | 16.3 | |
| Approach LOS | | B | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 14.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.47 | | |
| Actuated Cycle Length (s) | 51.2 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 55.4% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 137 | 4 | 141 | 16 | 5 | 12 | 66 | 238 | 1 | 3 | 310 | 57 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | | 1.00 | 0.90 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1539 | | 1652 | 1523 | | 1652 | 1705 | 1460 | 1711 | 3263 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1539 | | 1652 | 1523 | | 1652 | 1705 | 1460 | 1711 | 3263 | |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 157 | 5 | 162 | 18 | 6 | 14 | 76 | 274 | 1 | 3 | 356 | 66 |
| RTOR Reduction (vph) | 0 | 105 | 0 | 0 | 11 | 0 | 0 | 0 | 1 | 0 | 19 | 0 |
| Lane Group Flow (vph) | 157 | 62 | 0 | 18 | 9 | 0 | 76 | 274 | 0 | 3 | 403 | 0 |
| Confl. Peds. (#/hr) | | | | | | 4 | | | 3 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 2 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 10.0 | 22.8 | | 1.2 | 14.0 | | 5.8 | 23.6 | 23.6 | 1.0 | 18.8 | |
| Effective Green, g (s) | 10.0 | 22.8 | | 1.2 | 14.0 | | 5.8 | 23.6 | 23.6 | 1.0 | 18.8 | |
| Actuated g/C Ratio | 0.15 | 0.35 | | 0.02 | 0.22 | | 0.09 | 0.36 | 0.36 | 0.02 | 0.29 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 253 | 539 | | 30 | 327 | | 147 | 618 | 529 | 26 | 942 | |
| v/s Ratio Prot | c0.10 | c0.04 | | 0.01 | 0.01 | | c0.05 | c0.16 | | 0.00 | 0.12 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 0.62 | 0.11 | | 0.60 | 0.03 | | 0.52 | 0.44 | 0.00 | 0.12 | 0.43 | |
| Uniform Delay, d1 | 25.8 | 14.3 | | 31.7 | 20.2 | | 28.3 | 15.8 | 13.2 | 31.6 | 18.8 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.5 | 0.2 | | 40.4 | 0.1 | | 6.0 | 1.1 | 0.0 | 4.1 | 0.7 | |
| Delay (s) | 32.3 | 14.5 | | 72.1 | 20.2 | | 34.3 | 16.8 | 13.2 | 35.7 | 19.4 | |
| Level of Service | C | B | | E | C | | C | B | B | D | B | |
| Approach Delay (s) | | 23.1 | | | 44.8 | | | 20.6 | | | 19.6 | |
| Approach LOS | | C | | | D | | | C | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 21.7 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.42 | | |
| Actuated Cycle Length (s) | 65.1 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 41.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↑↑↑ | | ↕ | ↑↑ | |
| Volume (vph) | 3 | 0 | 0 | 18 | 0 | 73 | 0 | 700 | 37 | 97 | 589 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.99 | | 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 | | 0.99 | | 1.00 | 1.00 | |
| Flt Protected | | 0.95 | | | 0.95 | 1.00 | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1765 | | | 1562 | 1399 | | 4910 | | 1617 | 3470 | |
| Flt Permitted | | 0.74 | | | 0.76 | 1.00 | | 1.00 | | 0.33 | 1.00 | |
| Satd. Flow (perm) | | 1383 | | | 1243 | 1399 | | 4910 | | 563 | 3470 | |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 3 | 0 | 0 | 20 | 0 | 81 | 0 | 778 | 41 | 108 | 654 | 2 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 2 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 3 | 0 | 0 | 20 | 7 | 0 | 817 | 0 | 108 | 656 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 | 5 | | 2 | 2 | | 5 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 8.9 | | | 8.9 | 8.9 | | 92.5 | | 92.5 | 92.5 | |
| Effective Green, g (s) | | 8.9 | | | 8.9 | 8.9 | | 92.5 | | 92.5 | 92.5 | |
| Actuated g/C Ratio | | 0.08 | | | 0.08 | 0.08 | | 0.84 | | 0.84 | 0.84 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 111 | | | 100 | 113 | | 4128 | | 473 | 2917 | |
| v/s Ratio Prot | | | | | | | | 0.17 | | | 0.19 | |
| v/s Ratio Perm | | 0.00 | | | 0.02 | 0.00 | | | | 0.19 | | |
| v/c Ratio | | 0.03 | | | 0.20 | 0.06 | | 0.20 | | 0.23 | 0.22 | |
| Uniform Delay, d1 | | 46.6 | | | 47.2 | 46.7 | | 1.7 | | 1.7 | 1.7 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 0.61 | | 0.96 | 1.02 | |
| Incremental Delay, d2 | | 0.1 | | | 1.0 | 0.2 | | 0.1 | | 1.0 | 0.2 | |
| Delay (s) | | 46.7 | | | 48.2 | 46.9 | | 1.1 | | 2.6 | 1.9 | |
| Level of Service | | D | | | D | D | | A | | A | A | |
| Approach Delay (s) | | 46.7 | | | 47.2 | | | 1.1 | | | 2.0 | |
| Approach LOS | | D | | | D | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 4.4 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.23 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 35.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 30: Merced Street & Republic Ave

Existing PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 54 | 17 | 2 | 917 | 669 | 41 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Hourly flow rate (vph) | 56 | 18 | 2 | 955 | 697 | 43 |
| Pedestrians | 5 | | | | | |
| Lane Width (ft) | 16.0 | | | | | |
| Walking Speed (ft/s) | 4.0 | | | | | |
| Percent Blockage | 1 | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | 801 | 747 | |
| pX, platoon unblocked | 0.94 | 0.99 | 0.99 | | | |
| vC, conflicting volume | 1205 | 375 | 745 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1055 | 356 | 728 | | | |
| tC, single (s) | 6.9 | 7.0 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 72 | 97 | 100 | | | |
| cM capacity (veh/h) | 203 | 627 | 847 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|------------------------|------|------|------|------|------|
| Volume Total | 74 | 320 | 637 | 465 | 275 |
| Volume Left | 56 | 2 | 0 | 0 | 0 |
| Volume Right | 18 | 0 | 0 | 0 | 43 |
| cSH | 242 | 847 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.31 | 0.00 | 0.37 | 0.27 | 0.16 |
| Queue Length 95th (ft) | 31 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 26.3 | 0.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | D | A | | | |
| Approach Delay (s) | 26.3 | 0.0 | | 0.0 | |
| Approach LOS | D | | | | |

| Intersection Summary | | | | | |
|-----------------------------------|--|-------|-----|----------------------|---|
| Average Delay | | | 1.1 | | |
| Intersection Capacity Utilization | | 37.4% | | ICU Level of Service | A |
| Analysis Period (min) | | 15 | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

Existing PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 46 | 41 | 13 | 480 | 573 | 29 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1651 | 3240 | 3215 | |
| Flt Permitted | 0.95 | 1.00 | 0.39 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 670 | 3240 | 3215 | |
| Peak-hour factor, PHF | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 53 | 48 | 15 | 558 | 666 | 34 |
| RTOR Reduction (vph) | 0 | 43 | 0 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 53 | 5 | 15 | 558 | 695 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 6.2 | 6.2 | 39.8 | 39.8 | 39.8 | |
| Effective Green, g (s) | 6.2 | 6.2 | 39.8 | 39.8 | 39.8 | |
| Actuated g/C Ratio | 0.11 | 0.11 | 0.72 | 0.72 | 0.72 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 186 | 149 | 484 | 2344 | 2326 | |
| v/s Ratio Prot | c0.03 | | | 0.17 | c0.22 | |
| v/s Ratio Perm | | 0.00 | 0.02 | | | |
| v/c Ratio | 0.28 | 0.04 | 0.03 | 0.24 | 0.30 | |
| Uniform Delay, d1 | 22.4 | 21.7 | 2.1 | 2.5 | 2.7 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | |
| Incremental Delay, d2 | 0.8 | 0.1 | 0.1 | 0.2 | 0.3 | |
| Delay (s) | 23.2 | 21.8 | 2.3 | 2.8 | 2.6 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 22.6 | | | 2.8 | 2.6 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 4.1 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.30 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 27.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |































c Critical Lane Group

Existing Saturday

HCM Signalized Intersection Capacity Analysis

















Existing SAT

1: Doolittle Dr & Davis St

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|--|---|--|---|---|--|---|---|--|--|--|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |   | |   |  |  |  |    |  |   |   |   | |
| Volume (vph) | 12 | 70 | 12 | 124 | 74 | 306 | 16 | 205 | 148 | 358 | 275 | 25 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3114 | | 3255 | 1689 | 1501 | 1620 | 4655 | 1435 | 3143 | 3192 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3114 | | 3255 | 1689 | 1501 | 1620 | 4655 | 1435 | 3143 | 3192 | | |
| Peak-hour factor, PHF | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | |
| Adj. Flow (vph) | 12 | 73 | 12 | 129 | 77 | 319 | 17 | 214 | 154 | 373 | 286 | 26 | |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 0 | 168 | 0 | 0 | 92 | 0 | 5 | 0 | |
| Lane Group Flow (vph) | 12 | 75 | 0 | 129 | 77 | 151 | 17 | 214 | 62 | 373 | 307 | 0 | |
| Confl. Peds. (#/hr) | | | 2 | | | | | | 1 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 0.7 | 11.0 | | 8.2 | 18.5 | 31.0 | 3.3 | 18.3 | 26.5 | 12.5 | 27.5 | | |
| Effective Green, g (s) | 0.7 | 11.0 | | 8.2 | 18.5 | 31.0 | 3.3 | 18.3 | 26.5 | 12.5 | 27.5 | | |
| Actuated g/C Ratio | 0.01 | 0.17 | | 0.13 | 0.28 | 0.47 | 0.05 | 0.28 | 0.41 | 0.19 | 0.42 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 17 | 524 | | 408 | 478 | 712 | 81 | 1304 | 582 | 601 | 1344 | | |
| v/s Ratio Prot | 0.01 | 0.02 | | c0.04 | 0.05 | c0.04 | 0.01 | c0.05 | 0.01 | c0.12 | c0.10 | | |
| v/s Ratio Perm | | | | | | 0.06 | | | 0.03 | | | | |
| v/c Ratio | 0.71 | 0.14 | | 0.32 | 0.16 | 0.21 | 0.21 | 0.16 | 0.11 | 0.62 | 0.23 | | |
| Uniform Delay, d1 | 32.2 | 23.1 | | 26.0 | 17.6 | 10.0 | 29.7 | 17.7 | 12.1 | 24.2 | 12.1 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 72.3 | 0.1 | | 0.2 | 0.2 | 0.1 | 0.5 | 0.1 | 0.0 | 1.4 | 0.2 | | |
| Delay (s) | 104.5 | 23.3 | | 26.2 | 17.7 | 10.1 | 30.2 | 17.8 | 12.1 | 25.7 | 12.3 | | |
| Level of Service | F | C | | C | B | B | C | B | B | C | B | | |
| Approach Delay (s) | | 33.3 | | | 15.2 | | | 16.1 | | | 19.6 | | |
| Approach LOS | | C | | | B | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 18.2 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.34 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 65.3 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 41.7% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

Existing SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 20 | 196 | 10 | 21 | 265 | 17 | 4 | 16 | 32 | 13 | 17 | 15 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Hourly flow rate (vph) | 21 | 206 | 11 | 22 | 279 | 18 | 4 | 17 | 34 | 14 | 18 | 16 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 238 | 319 | 55 | 47 | | | | | | | | |
| Volume Left (vph) | 21 | 22 | 4 | 14 | | | | | | | | |
| Volume Right (vph) | 11 | 18 | 34 | 16 | | | | | | | | |
| Hadj (s) | 0.03 | 0.01 | -0.32 | -0.11 | | | | | | | | |
| Departure Headway (s) | 4.5 | 4.5 | 4.9 | 5.1 | | | | | | | | |
| Degree Utilization, x | 0.30 | 0.39 | 0.07 | 0.07 | | | | | | | | |
| Capacity (veh/h) | 766 | 781 | 649 | 619 | | | | | | | | |
| Control Delay (s) | 9.5 | 10.3 | 8.3 | 8.5 | | | | | | | | |
| Approach Delay (s) | 9.5 | 10.3 | 8.3 | 8.5 | | | | | | | | |
| Approach LOS | A | B | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 9.7 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 32.8% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd























Existing SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 65 | 234 | 29 | 190 | 316 | 112 | 17 | 203 | 173 | 137 | 251 | 64 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1445 | 1620 | 1739 | 1414 | 1652 | 3240 | 1351 | 1620 | 2981 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1445 | 1620 | 1739 | 1414 | 1652 | 3240 | 1351 | 1620 | 2981 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 73 | 263 | 33 | 213 | 355 | 126 | 19 | 228 | 194 | 154 | 282 | 72 |
| RTOR Reduction (vph) | 0 | 0 | 25 | 0 | 0 | 83 | 0 | 0 | 156 | 0 | 16 | 0 |
| Lane Group Flow (vph) | 73 | 263 | 8 | 213 | 355 | 43 | 19 | 228 | 38 | 154 | 338 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 7 | | | | | | 3 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 8.8 | 21.4 | 21.4 | 18.2 | 30.8 | 30.8 | 3.0 | 17.9 | 17.9 | 15.4 | 30.3 | |
| Effective Green, g (s) | 8.8 | 21.4 | 21.4 | 18.2 | 30.8 | 30.8 | 3.0 | 17.9 | 17.9 | 15.4 | 30.3 | |
| Actuated g/C Ratio | 0.10 | 0.24 | 0.24 | 0.20 | 0.34 | 0.34 | 0.03 | 0.20 | 0.20 | 0.17 | 0.33 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 159 | 409 | 340 | 324 | 589 | 479 | 54 | 638 | 266 | 274 | 993 | |
| v/s Ratio Prot | 0.04 | 0.15 | | c0.13 | c0.20 | | 0.01 | 0.07 | | c0.10 | c0.11 | |
| v/s Ratio Perm | | | 0.01 | | | 0.03 | | | 0.03 | | | |
| v/c Ratio | 0.46 | 0.64 | 0.02 | 0.66 | 0.60 | 0.09 | 0.35 | 0.36 | 0.14 | 0.56 | 0.34 | |
| Uniform Delay, d1 | 38.8 | 31.3 | 26.7 | 33.5 | 25.0 | 20.5 | 43.0 | 31.5 | 30.2 | 34.7 | 22.8 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.8 | 3.8 | 0.0 | 5.3 | 2.0 | 0.1 | 5.3 | 0.5 | 0.3 | 3.2 | 0.3 | |
| Delay (s) | 41.7 | 35.1 | 26.7 | 38.7 | 27.0 | 20.6 | 48.3 | 32.0 | 30.5 | 37.8 | 23.1 | |
| Level of Service | D | D | C | D | C | C | D | C | C | D | C | |
| Approach Delay (s) | | 35.7 | | | 29.4 | | | 32.0 | | | 27.5 | |
| Approach LOS | | D | | | C | | | C | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 30.7 | | | | HCM 2000 Level of Service | | | | C | |
| HCM 2000 Volume to Capacity ratio | | | 0.58 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 90.9 | | | Sum of lost time (s) | | | | 18.0 | | |
| Intersection Capacity Utilization | | | 53.2% | | | ICU Level of Service | | | | A | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

Existing SAT

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  | |  |  |  |  |  |  | |
| Volume (vph) | 41 | 572 | 40 | 431 | 547 | 107 | 50 | 185 | 438 | 167 | 147 | 24 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4604 | | 3255 | 3153 | | 1678 | 3355 | 2722 | 3255 | 3240 | 1469 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4604 | | 3255 | 3153 | | 1678 | 3355 | 2722 | 3255 | 3240 | 1469 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | |
| Adj. Flow (vph) | 42 | 590 | 41 | 444 | 564 | 110 | 52 | 191 | 452 | 172 | 152 | 25 | |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | |
| Lane Group Flow (vph) | 42 | 625 | 0 | 444 | 664 | 0 | 52 | 191 | 452 | 172 | 152 | 5 | |
| Confl. Peds. (#/hr) | | | 4 | | | 2 | | | 3 | | | 3 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 9.7 | 21.0 | | 35.0 | 46.3 | | 25.0 | 28.0 | 63.0 | 20.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 9.7 | 22.5 | | 35.0 | 47.8 | | 25.0 | 29.5 | 63.0 | 20.0 | 24.5 | 24.5 | |
| Actuated g/C Ratio | 0.08 | 0.18 | | 0.28 | 0.39 | | 0.20 | 0.24 | 0.51 | 0.16 | 0.20 | 0.20 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 123 | 842 | | 926 | 1225 | | 341 | 804 | 1394 | 529 | 645 | 292 | |
| v/s Ratio Prot | 0.03 | c0.14 | | 0.14 | c0.21 | | 0.03 | 0.06 | c0.17 | c0.05 | c0.05 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 | |
| v/c Ratio | 0.34 | 0.74 | | 0.48 | 0.54 | | 0.15 | 0.24 | 0.32 | 0.33 | 0.24 | 0.02 | |
| Uniform Delay, d1 | 53.6 | 47.5 | | 36.5 | 29.1 | | 40.3 | 37.7 | 17.5 | 45.5 | 41.4 | 39.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.3 | 3.8 | | 1.8 | 0.6 | | 0.9 | 0.2 | 0.2 | 1.6 | 0.3 | 0.0 | |
| Delay (s) | 55.9 | 51.3 | | 38.2 | 29.7 | | 41.2 | 37.9 | 17.7 | 47.2 | 41.6 | 39.6 | |
| Level of Service | E | D | | D | C | | D | D | B | D | D | D | |
| Approach Delay (s) | | 51.6 | | | 33.1 | | | 25.0 | | | 44.2 | | |
| Approach LOS | | D | | | C | | | C | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 36.9 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.50 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 123.0 | | | | | | | | | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | | | 68.7% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Existing SAT



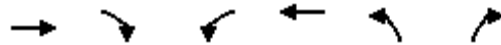
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | | ↑↑↑↑ | | ↗ |
| Volume (veh/h) | 1177 | 0 | 0 | 1241 | 0 | 0 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1279 | 0 | 0 | 1349 | 0 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | | | |
| pX, platoon unblocked | | | 0.92 | | 0.92 | 0.92 |
| vC, conflicting volume | | | 1279 | | 1729 | 320 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 884 | | 1371 | 0 |
| tC, single (s) | | | 4.1 | | 6.8 | 6.9 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 100 | | 100 | 100 |
| cM capacity (veh/h) | | | 702 | | 127 | 1001 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total | 366 | 366 | 366 | 183 | 450 | 450 | 450 | 0 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.22 | 0.22 | 0.22 | 0.11 | 0.26 | 0.26 | 0.26 | 0.00 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | | | | | | | | A |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | 0.0 |
| Approach LOS | | | | | | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|-----|------------------------|
| Average Delay | | 0.0 | |
| Intersection Capacity Utilization | 27.3% | | ICU Level of Service A |
| Analysis Period (min) | 15 | | |

HCM Unsignalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Existing SAT



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | ↙ | ↑↑ | | ↙ |
| Volume (veh/h) | 779 | 0 | 476 | 738 | 0 | 431 |
| Sign Control | Free | | | Free | Yield | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Hourly flow rate (vph) | 787 | 0 | 481 | 745 | 0 | 435 |
| Pedestrians | | | | 7 | | |
| Lane Width (ft) | | | | 10.7 | | |
| Walking Speed (ft/s) | | | | 4.0 | | |
| Percent Blockage | | | | 1 | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 930 | | | | | |
| pX, platoon unblocked | | | 0.92 | | 0.92 | 0.92 |
| vC, conflicting volume | | | 787 | | 2121 | 400 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 603 | | 2048 | 185 |
| tC, single (s) | | | 4.2 | | 6.9 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 46 | | 100 | 42 |
| cM capacity (veh/h) | | | 883 | | 20 | 753 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|
| Volume Total | 393 | 393 | 481 | 373 | 373 | 435 |
| Volume Left | 0 | 0 | 481 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 435 |
| cSH | 1700 | 1700 | 883 | 1700 | 1700 | 753 |
| Volume to Capacity | 0.23 | 0.23 | 0.54 | 0.22 | 0.22 | 0.58 |
| Queue Length 95th (ft) | 0 | 0 | 84 | 0 | 0 | 94 |
| Control Delay (s) | 0.0 | 0.0 | 13.8 | 0.0 | 0.0 | 16.1 |
| Lane LOS | | | B | | | C |
| Approach Delay (s) | 0.0 | | 5.4 | | | 16.1 |
| Approach LOS | | | | | | C |

| Intersection Summary | | | | | | |
|-----------------------------------|--|--|-------|--|----------------------|---|
| Average Delay | | | 5.6 | | | |
| Intersection Capacity Utilization | | | 63.3% | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

Existing SAT



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|-------|------|
| Lane Configurations | ↵ | ↑↑↑ | ↑↑ | | | ↵ |
| Volume (veh/h) | 380 | 1448 | 762 | 0 | 0 | 437 |
| Sign Control | | Free | Free | | Yield | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Hourly flow rate (vph) | 388 | 1478 | 778 | 0 | 0 | 446 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | 841 | | | |
| pX, platoon unblocked | 0.91 | | | | 0.91 | 0.91 |
| vC, conflicting volume | 778 | | | | 2046 | 389 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 563 | | | | 1953 | 137 |
| tC, single (s) | 4.2 | | | | 6.8 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 57 | | | | 100 | 44 |
| cM capacity (veh/h) | 904 | | | | 29 | 803 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 388 | 493 | 493 | 493 | 389 | 389 | 446 |
| Volume Left | 388 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 446 |
| cSH | 904 | 1700 | 1700 | 1700 | 1700 | 1700 | 803 |
| Volume to Capacity | 0.43 | 0.29 | 0.29 | 0.29 | 0.23 | 0.23 | 0.56 |
| Queue Length 95th (ft) | 55 | 0 | 0 | 0 | 0 | 0 | 87 |
| Control Delay (s) | 11.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.9 |
| Lane LOS | B | | | | | | B |
| Approach Delay (s) | 2.5 | | | | 0.0 | | 14.9 |
| Approach LOS | | | | | | | B |



















Intersection Summary

| | | | |
|-----------------------------------|-------|-----|------------------------|
| Average Delay | | 3.7 | |
| Intersection Capacity Utilization | 54.8% | | ICU Level of Service A |
| Analysis Period (min) | 15 | | |

Description: 24-hour count of eastbound left turn done Thursday, Sept 27, 2007, Peak-hour 7:00-8:00 AM. Other volumes calculated from Caltrans ramp count.

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Existing SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 4 | 116 | 10 | 24 | 102 | 16 | 15 | 18 | 32 | 14 | 9 | 15 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Hourly flow rate (vph) | 5 | 132 | 11 | 27 | 116 | 18 | 17 | 20 | 36 | 16 | 10 | 17 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 5 | 143 | 161 | 74 | 43 | | | | | | | |
| Volume Left (vph) | 5 | 0 | 27 | 17 | 16 | | | | | | | |
| Volume Right (vph) | 0 | 11 | 18 | 36 | 17 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | 0.00 | -0.22 | -0.13 | | | | | | | |
| Departure Headway (s) | 5.4 | 4.9 | 4.5 | 4.5 | 4.6 | | | | | | | |
| Degree Utilization, x | 0.01 | 0.19 | 0.20 | 0.09 | 0.06 | | | | | | | |
| Capacity (veh/h) | 644 | 711 | 775 | 749 | 720 | | | | | | | |
| Control Delay (s) | 7.3 | 7.9 | 8.6 | 7.9 | 7.9 | | | | | | | |
| Approach Delay (s) | 7.8 | | 8.6 | 7.9 | 7.9 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.1 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 28.7% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
23: Doolittle Dr & Fairway Drive/Fairway Dr

Existing SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 59 | 95 | 51 | 34 | 85 | 78 | 47 | 241 | 30 | 97 | 239 | 61 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.97 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1704 | 1255 | 1615 | 1739 | 1323 | 1711 | 3027 | | 1620 | 2981 | |
| Flt Permitted | | 0.84 | 1.00 | 0.66 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1453 | 1255 | 1114 | 1739 | 1323 | 1711 | 3027 | | 1620 | 2981 | |
| Peak-hour factor, PHF | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Adj. Flow (vph) | 61 | 99 | 53 | 35 | 89 | 81 | 49 | 251 | 31 | 101 | 249 | 64 |
| RTOR Reduction (vph) | 0 | 0 | 42 | 0 | 0 | 64 | 0 | 12 | 0 | 0 | 27 | 0 |
| Lane Group Flow (vph) | 0 | 160 | 11 | 35 | 89 | 17 | 49 | 270 | 0 | 101 | 286 | 0 |
| Confl. Peds. (#/hr) | 7 | | 4 | 7 | | 7 | | | | | | 3 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 2.6 | 18.0 | | 5.1 | 20.5 | |
| Effective Green, g (s) | | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 2.6 | 18.0 | | 5.1 | 20.5 | |
| Actuated g/C Ratio | | 0.21 | 0.21 | 0.21 | 0.21 | 0.21 | 0.05 | 0.37 | | 0.11 | 0.42 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 309 | 267 | 237 | 370 | 281 | 91 | 1125 | | 170 | 1262 | |
| v/s Ratio Prot | | | | | 0.05 | | 0.03 | 0.09 | | c0.06 | c0.10 | |
| v/s Ratio Perm | | c0.11 | 0.01 | 0.03 | | 0.01 | | | | | | |
| v/c Ratio | | 0.52 | 0.04 | 0.15 | 0.24 | 0.06 | 0.54 | 0.24 | | 0.59 | 0.23 | |
| Uniform Delay, d1 | | 16.9 | 15.1 | 15.5 | 15.8 | 15.2 | 22.3 | 10.5 | | 20.7 | 8.9 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.5 | 0.1 | 0.3 | 0.3 | 0.1 | 6.0 | 0.2 | | 5.5 | 0.1 | |
| Delay (s) | | 18.3 | 15.2 | 15.8 | 16.1 | 15.3 | 28.3 | 10.6 | | 26.1 | 9.0 | |
| Level of Service | | B | B | B | B | B | C | B | | C | A | |
| Approach Delay (s) | | 17.5 | | | 15.7 | | | 13.3 | | | 13.2 | |
| Approach LOS | | B | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 14.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 48.4 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 41.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

Existing SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|-------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 105 | 118 | 66 | 50 | 116 | 53 | 41 | 388 | 42 | 33 | 350 | 58 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1593 | 1863 | 1348 | 1593 | 1863 | 1372 | 1652 | 3177 | | 1593 | 3155 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1593 | 1863 | 1348 | 1593 | 1863 | 1372 | 1652 | 3177 | | 1593 | 3155 | |
| Peak-hour factor, PHF | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Adj. Flow (vph) | 107 | 120 | 67 | 51 | 118 | 54 | 42 | 396 | 43 | 34 | 357 | 59 |
| RTOR Reduction (vph) | 0 | 0 | 48 | 0 | 0 | 41 | 0 | 5 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 107 | 120 | 19 | 51 | 118 | 13 | 42 | 434 | 0 | 34 | 406 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | | | | 2 | | | 3 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 12.9 | 28.8 | 28.8 | 8.5 | 24.4 | 24.4 | 5.7 | 40.5 | | 5.5 | 40.3 | |
| Effective Green, g (s) | 12.9 | 28.8 | 28.8 | 8.5 | 24.4 | 24.4 | 5.7 | 40.5 | | 5.5 | 40.3 | |
| Actuated g/C Ratio | 0.13 | 0.28 | 0.28 | 0.08 | 0.24 | 0.24 | 0.06 | 0.40 | | 0.05 | 0.39 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 200 | 524 | 379 | 132 | 444 | 327 | 92 | 1257 | | 85 | 1242 | |
| v/s Ratio Prot | c0.07 | 0.06 | | c0.03 | c0.06 | | 0.03 | c0.14 | | 0.02 | c0.13 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.54 | 0.23 | 0.05 | 0.39 | 0.27 | 0.04 | 0.46 | 0.34 | | 0.40 | 0.33 | |
| Uniform Delay, d1 | 41.9 | 28.2 | 26.8 | 44.4 | 31.7 | 29.9 | 46.8 | 21.6 | | 46.8 | 21.6 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.5 | 0.3 | 0.1 | 2.6 | 0.4 | 0.1 | 4.8 | 0.8 | | 4.2 | 0.4 | |
| Delay (s) | 45.4 | 28.5 | 26.9 | 47.0 | 32.1 | 30.0 | 51.6 | 22.4 | | 51.0 | 22.0 | |
| Level of Service | D | C | C | D | C | C | D | C | | D | C | |
| Approach Delay (s) | | 34.3 | | | 35.0 | | | 24.9 | | | 24.2 | |
| Approach LOS | | C | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 28.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.36 | | |
| Actuated Cycle Length (s) | 102.3 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 52.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

Baseline AM

HCM Signalized Intersection Capacity Analysis

Baseline AM

1: Doolittle Dr & Davis St

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|---------------------|------|-------|-------|------|-------|------|-------|-------|------|------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 26 | 94 | 34 | 236 | 102 | 737 | 45 | 776 | 199 | 340 | 296 | 44 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3067 | | 3255 | 1689 | 1490 | 1620 | 4655 | 1434 | 3143 | 3165 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3067 | | 3255 | 1689 | 1490 | 1620 | 4655 | 1434 | 3143 | 3165 | | |
| 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) | 28 | 102 | 37 | 257 | 111 | 801 | 49 | 843 | 216 | 370 | 322 | 48 | |
| RTOR Reduction (vph) | 0 | 31 | 0 | 0 | 0 | 186 | 0 | 0 | 122 | 0 | 9 | 0 | |
| Lane Group Flow (vph) | 28 | 108 | 0 | 257 | 111 | 615 | 49 | 843 | 94 | 370 | 361 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 2.4 | 13.9 | | 11.1 | 22.6 | 40.6 | 15.6 | 25.2 | 36.3 | 18.0 | 27.6 | | |
| Effective Green, g (s) | 2.4 | 13.9 | | 11.1 | 22.6 | 40.6 | 15.6 | 25.2 | 36.3 | 18.0 | 27.6 | | |
| Actuated g/C Ratio | 0.03 | 0.17 | | 0.13 | 0.27 | 0.49 | 0.19 | 0.30 | 0.43 | 0.22 | 0.33 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 48 | 510 | | 432 | 457 | 724 | 302 | 1404 | 623 | 677 | 1046 | | |
| v/s Ratio Prot | 0.02 | 0.04 | | c0.08 | 0.07 | c0.18 | 0.03 | c0.18 | 0.02 | 0.12 | 0.11 | | |
| v/s Ratio Perm | | | | | | 0.23 | | | 0.05 | | | | |
| v/c Ratio | 0.58 | 0.21 | | 0.59 | 0.24 | 0.85 | 0.16 | 0.60 | 0.15 | 0.55 | 0.35 | | |
| Uniform Delay, d1 | 40.1 | 30.1 | | 34.1 | 23.8 | 18.8 | 28.5 | 24.9 | 14.3 | 29.1 | 21.1 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 11.1 | 0.2 | | 1.5 | 0.3 | 8.8 | 0.1 | 0.8 | 0.0 | 0.5 | 0.3 | | |
| Delay (s) | 51.2 | 30.3 | | 35.6 | 24.0 | 27.6 | 28.6 | 25.7 | 14.3 | 29.6 | 21.5 | | |
| Level of Service | D | C | | D | C | C | C | C | B | C | C | | |
| Approach Delay (s) | | 33.8 | | | 29.0 | | | 23.6 | | | 25.5 | | |
| Approach LOS | | C | | | C | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 26.6 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.76 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 83.5 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 75.6% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

Baseline AM

2: Phillips Ln & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|-------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↖ | ↖ | ↗ | | ↖ | ↗ | ↖ |
| Volume (vph) | 73 | 537 | 9 | 22 | 1116 | 122 | 24 | 0 | 85 | 85 | 1 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3170 | | 1620 | 3069 | 1323 | 1678 | 1429 | | 3143 | 1395 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.33 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3170 | | 1620 | 3069 | 1323 | 574 | 1429 | | 3143 | 1395 | |
| 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) | 79 | 584 | 10 | 24 | 1213 | 133 | 26 | 0 | 92 | 92 | 1 | 58 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 0 | 40 | 0 | 81 | 0 | 0 | 50 | 0 |
| Lane Group Flow (vph) | 79 | 593 | 0 | 24 | 1226 | 80 | 26 | 11 | 0 | 92 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 9.7 | 61.6 | | 4.3 | 56.2 | 70.0 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Effective Green, g (s) | 9.7 | 61.6 | | 4.3 | 56.2 | 70.0 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.09 | 0.59 | | 0.04 | 0.54 | 0.67 | 0.12 | 0.12 | | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 149 | 1859 | | 66 | 1642 | 882 | 67 | 167 | | 413 | 183 | |
| v/s Ratio Prot | c0.05 | 0.19 | | 0.01 | c0.40 | 0.01 | | 0.01 | | c0.03 | | |
| v/s Ratio Perm | | | | | | 0.05 | c0.05 | | | | | 0.01 |
| v/c Ratio | 0.53 | 0.32 | | 0.36 | 0.75 | 0.09 | 0.39 | 0.06 | | 0.22 | 0.05 | |
| Uniform Delay, d1 | 45.5 | 11.0 | | 49.0 | 18.9 | 6.2 | 42.9 | 41.2 | | 40.8 | 39.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.16 | 0.83 | 1.25 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.8 | 0.5 | | 1.0 | 2.5 | 0.0 | 1.4 | 0.1 | | 0.3 | 0.1 | |
| Delay (s) | 47.3 | 11.5 | | 58.0 | 18.1 | 7.8 | 44.2 | 41.3 | | 41.1 | 40.0 | |
| Level of Service | D | B | | E | B | A | D | D | | D | D | |
| Approach Delay (s) | | 15.7 | | | 17.9 | | | 41.9 | | | 40.6 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 20.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.60 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 65.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↖ | ↗↖↗ | | ↖↗ | ↖↗ | | | ↖ | ↗↖↗ | ↖ | ↗ | |
| Volume (vph) | 6 | 651 | 50 | 222 | 1180 | 41 | 68 | 30 | 150 | 118 | 56 | 23 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.97 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4520 | | 3143 | 3305 | | | 1825 | 2807 | 1562 | 1554 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.75 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4520 | | 3143 | 3305 | | | 1407 | 2807 | 1562 | 1554 | |
| 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) | 7 | 708 | 54 | 241 | 1283 | 45 | 74 | 33 | 163 | 128 | 61 | 25 |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 2 | 0 | 0 | 0 | 121 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 7 | 755 | 0 | 241 | 1326 | 0 | 0 | 107 | 42 | 128 | 72 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 1.0 | 50.7 | | 13.9 | 64.1 | | | 13.1 | 27.0 | 13.8 | 13.8 | |
| Effective Green, g (s) | 1.0 | 50.7 | | 13.9 | 64.1 | | | 13.1 | 27.0 | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.01 | 0.48 | | 0.13 | 0.61 | | | 0.12 | 0.26 | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 15 | 2182 | | 416 | 2017 | | | 175 | 721 | 205 | 204 | |
| v/s Ratio Prot | c0.00 | 0.17 | | 0.08 | c0.40 | | | | 0.01 | c0.08 | 0.05 | |
| v/s Ratio Perm | | | | | | | | c0.08 | 0.01 | | | |
| v/c Ratio | 0.47 | 0.35 | | 0.58 | 0.66 | | | 0.61 | 0.06 | 0.62 | 0.35 | |
| Uniform Delay, d1 | 51.7 | 16.9 | | 42.8 | 13.3 | | | 43.5 | 29.4 | 43.1 | 41.5 | |
| Progression Factor | 0.80 | 0.63 | | 1.14 | 0.76 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.9 | 0.4 | | 0.9 | 1.3 | | | 4.4 | 0.0 | 4.2 | 0.4 | |
| Delay (s) | 49.5 | 11.1 | | 49.9 | 11.4 | | | 47.9 | 29.4 | 47.4 | 41.9 | |
| Level of Service | D | B | | D | B | | | D | C | D | D | |
| Approach Delay (s) | | 11.4 | | | 17.3 | | | 36.8 | | | 45.2 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.7 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 68.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: I-880 SB ramps & Davis St/Davis Street

Baseline AM

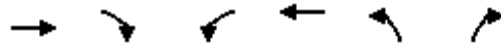


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|--------|------|---------------------------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 531 | 381 | 0 | 1106 | 384 | 0 | 0 | 0 | 194 | 0 | 366 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.96 | | | | | 1.00 | 0.86 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3108 | | | | | 1681 | 1421 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3108 | | | | | 1681 | 1421 | 1461 |
| 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 | 577 | 414 | 0 | 1202 | 417 | 0 | 0 | 0 | 211 | 0 | 398 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 49 | 49 |
| Lane Group Flow (vph) | 0 | 577 | 414 | 0 | 1597 | 0 | 0 | 0 | 0 | 190 | 163 | 158 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 74.6 | 105.0 | | 74.6 | | | | | 22.4 | 22.4 | 22.4 |
| Effective Green, g (s) | | 74.6 | 105.0 | | 74.6 | | | | | 22.4 | 22.4 | 22.4 |
| Actuated g/C Ratio | | 0.71 | 1.00 | | 0.71 | | | | | 0.21 | 0.21 | 0.21 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2338 | 1439 | | 2208 | | | | | 358 | 303 | 311 |
| v/s Ratio Prot | | 0.18 | | | c0.51 | | | | | 0.11 | c0.11 | 0.11 |
| v/s Ratio Perm | | | 0.29 | | | | | | | | | |
| v/c Ratio | | 0.25 | 0.29 | | 0.72 | | | | | 0.53 | 0.54 | 0.51 |
| Uniform Delay, d1 | | 5.3 | 0.0 | | 9.1 | | | | | 36.6 | 36.7 | 36.4 |
| Progression Factor | | 0.64 | 1.00 | | 0.87 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.2 | 0.1 | | 1.9 | | | | | 1.5 | 1.8 | 1.3 |
| Delay (s) | | 3.7 | 0.1 | | 9.8 | | | | | 38.2 | 38.6 | 37.8 |
| Level of Service | | A | A | | A | | | | | D | D | D |
| Approach Delay (s) | | 2.2 | | | 9.8 | | | 0.0 | | | 38.2 | |
| Approach LOS | | A | | | A | | | A | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 12.8 | | HCM 2000 Level of Service | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.68 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | | | | | 8.0 | | |
| Intersection Capacity Utilization | | | 64.6% | | ICU Level of Service | | | | | C | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

Baseline AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|-------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↑↑↑ | ↑ |
| Volume (vph) | 513 | 390 | 0 | 1071 | 399 | 185 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Frt | 0.94 | | | 1.00 | 0.99 | 0.85 |
| Flt Protected | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3310 | | | 3539 | 3426 | 1441 |
| Flt Permitted | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3310 | | | 3539 | 3426 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 558 | 424 | 0 | 1164 | 434 | 201 |
| RTOR Reduction (vph) | 76 | 0 | 0 | 0 | 4 | 149 |
| Lane Group Flow (vph) | 906 | 0 | 0 | 1164 | 450 | 32 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 79.6 | | | 79.6 | 18.4 | 18.4 |
| Effective Green, g (s) | 79.6 | | | 79.6 | 18.4 | 18.4 |
| Actuated g/C Ratio | 0.76 | | | 0.76 | 0.18 | 0.18 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2509 | | | 2682 | 600 | 252 |
| v/s Ratio Prot | 0.27 | | | c0.33 | c0.13 | 0.02 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.36 | | | 0.43 | 0.75 | 0.13 |
| Uniform Delay, d1 | 4.2 | | | 4.6 | 41.1 | 36.5 |
| Progression Factor | 1.05 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.4 | | | 0.5 | 4.5 | 0.1 |
| Delay (s) | 4.8 | | | 5.1 | 45.6 | 36.6 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 4.8 | | | 5.1 | 43.0 | |
| Approach LOS | A | | | A | D | |






















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 13.7 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.49 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 49.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

6: Doolittle Dr & Williams St

Baseline AM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|--|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  |  | |
| Volume (vph) | 104 | 126 | 19 | 79 | 88 | 138 | 24 | 850 | 83 | 46 | 333 | 57 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | | |
| Flt Protected | | 0.98 | | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1533 | | | 1691 | 1304 | 1620 | 3030 | | 1562 | 2997 | | |
| Flt Permitted | | 0.79 | | | 0.75 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1233 | | | 1292 | 1304 | 1620 | 3030 | | 1562 | 2997 | | |
| 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) | 113 | 137 | 21 | 86 | 96 | 150 | 26 | 924 | 90 | 50 | 362 | 62 | |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 105 | 0 | 8 | 0 | 0 | 15 | 0 | |
| Lane Group Flow (vph) | 0 | 268 | 0 | 0 | 182 | 45 | 26 | 1006 | 0 | 50 | 409 | 0 | |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | 5 | | 2 | 2 | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 19.8 | | | 19.8 | 19.8 | 3.0 | 27.3 | | 5.1 | 28.9 | | |
| Effective Green, g (s) | | 19.8 | | | 19.8 | 19.8 | 3.0 | 27.3 | | 5.1 | 28.9 | | |
| Actuated g/C Ratio | | 0.30 | | | 0.30 | 0.30 | 0.05 | 0.42 | | 0.08 | 0.44 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 373 | | | 391 | 394 | 74 | 1264 | | 121 | 1324 | | |
| v/s Ratio Prot | | | | | | | 0.02 | c0.33 | | c0.03 | 0.14 | | |
| v/s Ratio Perm | | c0.22 | | | 0.14 | 0.03 | | | | | | | |
| v/c Ratio | | 0.72 | | | 0.47 | 0.12 | 0.35 | 0.80 | | 0.41 | 0.31 | | |
| Uniform Delay, d1 | | 20.3 | | | 18.5 | 16.5 | 30.3 | 16.6 | | 28.7 | 11.8 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 6.9 | | | 1.2 | 0.2 | 3.9 | 3.8 | | 3.1 | 0.2 | | |
| Delay (s) | | 27.2 | | | 19.7 | 16.7 | 34.2 | 20.4 | | 31.8 | 12.0 | | |
| Level of Service | | C | | | B | B | C | C | | C | B | | |
| Approach Delay (s) | | 27.2 | | | 18.3 | | | 20.7 | | | 14.1 | | |
| Approach LOS | | C | | | B | | | C | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 19.7 | | HCM 2000 Level of Service | | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.73 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 65.4 | | Sum of lost time (s) | | | | | | 13.7 | | |
| Intersection Capacity Utilization | | | 64.9% | | ICU Level of Service | | | | | | C | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

Baseline AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 28 | 249 | 359 | 191 | 129 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 30 | 271 | 390 | 208 | 140 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 54 | 0 | 49 |
| Lane Group Flow (vph) | 30 | 271 | 390 | 154 | 140 | 8 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 4.6 | 86.3 | 77.7 | 77.7 | 15.1 | 15.1 |
| Effective Green, g (s) | 4.6 | 86.3 | 77.7 | 77.7 | 15.1 | 15.1 |
| Actuated g/C Ratio | 0.04 | 0.78 | 0.71 | 0.71 | 0.14 | 0.14 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 67 | 1433 | 1204 | 1099 | 214 | 185 |
| v/s Ratio Prot | c0.02 | 0.15 | c0.23 | | c0.09 | |
| v/s Ratio Perm | | | | 0.10 | | 0.01 |
| v/c Ratio | 0.45 | 0.19 | 0.32 | 0.14 | 0.65 | 0.04 |
| Uniform Delay, d1 | 51.5 | 3.0 | 6.1 | 5.3 | 45.0 | 41.2 |
| Progression Factor | 1.00 | 1.00 | 1.18 | 1.69 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.7 | 0.3 | 0.6 | 0.2 | 7.0 | 0.1 |
| Delay (s) | 53.2 | 3.3 | 7.9 | 9.1 | 52.0 | 41.3 |
| Level of Service | D | A | A | A | D | D |
| Approach Delay (s) | | 8.3 | 8.3 | | 48.9 | |
| Approach LOS | | A | A | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 15.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.38 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 38.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

Baseline AM

8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBT | EBR | WBL | WBT | WBR | NBL2 | NBL | NBR | SBT | SEL | SER |
|------------------------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | ↑ | ↗ | ↖ | ↗ | | | ↘ | ↗ | ↕ | ↘ | |
| Volume (vph) | 287 | 107 | 186 | 312 | 1 | 279 | 5 | 223 | 7 | 0 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 9 | 10 | 10 | 11 | 11 | 16 | 12 | 12 | 12 |
| Total Lost time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.97 | 1.00 | 1.00 | | | 1.00 | 0.97 | 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 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.86 | |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| 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 |
| Adj. Flow (vph) | 312 | 116 | 202 | 339 | 1 | 303 | 5 | 242 | 8 | 0 | 8 |
| RTOR Reduction (vph) | 0 | 71 | 0 | 0 | 0 | 0 | 0 | 125 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 312 | 45 | 202 | 340 | 0 | 0 | 308 | 117 | 8 | 8 | 0 |
| Confl. Peds. (#/hr) | | 14 | | | | | | 2 | | 2 | |
| Confl. Bikes (#/hr) | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Turn Type | NA | Perm | Prot | NA | | Prot | Prot | Perm | NA | Prot | |
| Protected Phases | 2 | | 1 | 6 | | 4 | 4 | | 8 | 7 | |
| Permitted Phases | | 2 | | | | | | 4 | | | |
| Actuated Green, G (s) | 42.6 | 42.6 | 18.3 | 64.9 | | | 24.7 | 24.7 | 1.4 | 2.4 | |
| Effective Green, g (s) | 42.6 | 42.6 | 18.3 | 64.9 | | | 24.7 | 24.7 | 1.4 | 2.4 | |
| Actuated g/C Ratio | 0.39 | 0.39 | 0.17 | 0.59 | | | 0.22 | 0.22 | 0.01 | 0.02 | |
| Clearance Time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 681 | 558 | 259 | 1005 | | | 376 | 383 | 23 | 34 | |
| v/s Ratio Prot | c0.18 | | c0.13 | 0.20 | | | c0.18 | | c0.00 | c0.01 | |
| v/s Ratio Perm | | 0.03 | | | | | | 0.07 | | | |
| v/c Ratio | 0.46 | 0.08 | 0.78 | 0.34 | | | 0.82 | 0.31 | 0.35 | 0.24 | |
| Uniform Delay, d1 | 25.1 | 21.3 | 43.9 | 11.6 | | | 40.5 | 35.5 | 53.8 | 52.9 | |
| Progression Factor | 0.95 | 1.19 | 1.00 | 1.00 | | | 1.01 | 1.12 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 0.3 | 13.8 | 0.9 | | | 12.3 | 0.4 | 8.9 | 3.5 | |
| Delay (s) | 26.1 | 25.6 | 57.7 | 12.5 | | | 53.4 | 40.3 | 62.8 | 56.4 | |
| Level of Service | C | C | E | B | | | D | D | E | E | |
| Approach Delay (s) | 26.0 | | | 29.3 | | | | | 62.8 | 56.4 | |
| Approach LOS | C | | | C | | | | | E | E | |

Intersection Summary

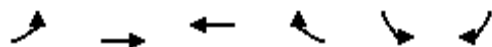
| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 35.3 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.61 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 20.6 |
| Intersection Capacity Utilization | 79.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

Baseline AM



















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | ↑ | ↗ | ↘ | |
| Volume (veh/h) | 1 | 72 | 126 | 14 | 26 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1 | 78 | 137 | 15 | 28 | 10 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 152 | | | | 217 | 137 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 152 | | | | 217 | 137 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 96 | 99 |
| cM capacity (veh/h) | 1429 | | | | 770 | 912 |

| Direction, Lane # | EB 1 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|
| Volume Total | 79 | 137 | 15 | 38 |
| Volume Left | 1 | 0 | 0 | 28 |
| Volume Right | 0 | 0 | 15 | 10 |
| cSH | 1429 | 1700 | 1700 | 802 |
| Volume to Capacity | 0.00 | 0.08 | 0.01 | 0.05 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 4 |
| Control Delay (s) | 0.1 | 0.0 | 0.0 | 9.7 |
| Lane LOS | A | | | A |
| Approach Delay (s) | 0.1 | 0.0 | | 9.7 |
| Approach LOS | | | | A |

| Intersection Summary | | | |
|-----------------------------------|--|-------|------------------------|
| Average Delay | | 1.4 | |
| Intersection Capacity Utilization | | 16.6% | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

Baseline AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 33 | 123 | 10 | 23 | 88 | 79 | 10 | 130 | 51 | 43 | 51 | 14 |
| 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 |
| Hourly flow rate (vph) | 36 | 134 | 11 | 25 | 96 | 86 | 11 | 141 | 55 | 47 | 55 | 15 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 180 | 207 | 208 | 117 | | | | | | | | |
| Volume Left (vph) | 36 | 25 | 11 | 47 | | | | | | | | |
| Volume Right (vph) | 11 | 86 | 55 | 15 | | | | | | | | |
| Hadj (s) | 0.04 | -0.19 | -0.12 | 0.04 | | | | | | | | |
| Departure Headway (s) | 5.1 | 4.8 | 4.9 | 5.2 | | | | | | | | |
| Degree Utilization, x | 0.25 | 0.28 | 0.28 | 0.17 | | | | | | | | |
| Capacity (veh/h) | 654 | 691 | 665 | 624 | | | | | | | | |
| Control Delay (s) | 9.8 | 9.6 | 9.9 | 9.3 | | | | | | | | |
| Approach Delay (s) | 9.8 | 9.6 | 9.9 | 9.3 | | | | | | | | |
| Approach LOS | A | A | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 9.7 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 40.7% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

Baseline AM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 53 | 212 | 65 | 138 | 146 | 322 | 10 | 597 | 248 | 178 | 228 | 27 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 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 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 1739 | 1448 | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 3027 | | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 1739 | 1448 | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 3027 | | |
| 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) | 58 | 230 | 71 | 150 | 159 | 350 | 11 | 649 | 270 | 193 | 248 | 29 | |
| RTOR Reduction (vph) | 0 | 0 | 57 | 0 | 0 | 255 | 0 | 0 | 101 | 0 | 5 | 0 | |
| Lane Group Flow (vph) | 58 | 230 | 14 | 150 | 159 | 95 | 11 | 649 | 169 | 193 | 272 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 8.5 | 20.7 | 20.7 | 16.5 | 28.7 | 28.7 | 1.4 | 31.1 | 31.1 | 19.4 | 49.1 | | |
| Effective Green, g (s) | 8.5 | 20.7 | 20.7 | 16.5 | 28.7 | 28.7 | 1.4 | 31.1 | 31.1 | 19.4 | 49.1 | | |
| Actuated g/C Ratio | 0.08 | 0.20 | 0.20 | 0.16 | 0.27 | 0.27 | 0.01 | 0.29 | 0.29 | 0.18 | 0.46 | | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 132 | 340 | 283 | 252 | 472 | 379 | 21 | 953 | 391 | 297 | 1406 | | |
| v/s Ratio Prot | 0.04 | c0.13 | | c0.09 | 0.09 | | 0.01 | c0.20 | | c0.12 | 0.09 | | |
| v/s Ratio Perm | | | 0.01 | | | 0.07 | | | 0.13 | | | | |
| v/c Ratio | 0.44 | 0.68 | 0.05 | 0.60 | 0.34 | 0.25 | 0.52 | 0.68 | 0.43 | 0.65 | 0.19 | | |
| Uniform Delay, d1 | 46.3 | 39.4 | 34.5 | 41.5 | 30.9 | 30.1 | 51.8 | 32.9 | 30.2 | 40.0 | 16.6 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 3.2 | 5.7 | 0.1 | 4.4 | 0.6 | 0.5 | 27.4 | 2.2 | 1.0 | 5.4 | 0.1 | | |
| Delay (s) | 49.5 | 45.1 | 34.6 | 45.9 | 31.4 | 30.6 | 79.2 | 35.1 | 31.2 | 45.4 | 16.7 | | |
| Level of Service | D | D | C | D | C | C | E | D | C | D | B | | |
| Approach Delay (s) | | 43.8 | | | 34.3 | | | 34.5 | | | 28.5 | | |
| Approach LOS | | D | | | C | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 34.6 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.66 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.7 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 60.6% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 36 | 621 | 28 | 755 | 669 | 237 | 74 | 216 | 586 | 164 | 149 | 28 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 4.0 | 4.0 | 5.5 | 5.5 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4625 | | 3255 | 3099 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4625 | | 3255 | 3099 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| 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) | 39 | 675 | 30 | 821 | 727 | 258 | 80 | 235 | 637 | 178 | 162 | 30 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| Lane Group Flow (vph) | 39 | 701 | 0 | 821 | 952 | 0 | 80 | 235 | 637 | 178 | 162 | 6 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 6.9 | 22.0 | | 33.0 | 48.1 | | 13.0 | 25.0 | 58.0 | 11.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 6.9 | 22.0 | | 33.0 | 48.1 | | 13.0 | 25.0 | 58.0 | 11.0 | 23.0 | 23.0 |
| Actuated g/C Ratio | 0.06 | 0.20 | | 0.30 | 0.44 | | 0.12 | 0.23 | 0.53 | 0.10 | 0.21 | 0.21 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 97 | 925 | | 976 | 1355 | | 198 | 762 | 1426 | 325 | 677 | 307 |
| v/s Ratio Prot | 0.02 | c0.15 | | c0.25 | 0.31 | | 0.05 | 0.07 | c0.24 | c0.05 | 0.05 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 |
| v/c Ratio | 0.40 | 0.76 | | 0.84 | 0.70 | | 0.40 | 0.31 | 0.45 | 0.55 | 0.24 | 0.02 |
| Uniform Delay, d1 | 49.6 | 41.5 | | 36.0 | 25.1 | | 44.9 | 35.3 | 16.1 | 47.1 | 36.2 | 34.6 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 | 0.94 | 1.14 | 0.94 | 0.86 | 1.00 |
| Incremental Delay, d2 | 3.7 | 5.8 | | 8.7 | 3.1 | | 6.0 | 0.3 | 0.3 | 6.1 | 0.2 | 0.0 |
| Delay (s) | 53.3 | 47.3 | | 44.8 | 28.2 | | 50.2 | 33.4 | 18.7 | 50.5 | 31.2 | 34.6 |
| Level of Service | D | D | | D | C | | D | C | B | D | C | C |
| Approach Delay (s) | | 47.6 | | | 35.7 | | | 25.0 | | | 40.8 | |
| Approach LOS | | D | | | D | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 35.8 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 75.5% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Baseline AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↙ | ↑↑ | | ↗ |
| Volume (veh/h) | 1371 | 0 | 0 | 1523 | 0 | 20 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1490 | 0 | 0 | 1655 | 0 | 22 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | 450 | | |
| pX, platoon unblocked | | | | 0.91 | 0.89 | 0.91 |
| vC, conflicting volume | 1490 | | | 2318 | 373 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1027 | | | 1440 | 0 | |
| tC, single (s) | 4.1 | | | 6.8 | 6.9 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | 3.5 | 3.3 | |
| p0 queue free % | 100 | | | 100 | 98 | |
| cM capacity (veh/h) | 609 | | | 109 | 983 | |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total | 426 | 426 | 426 | 213 | 0 | 828 | 828 | 22 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 983 |
| Volume to Capacity | 0.25 | 0.25 | 0.25 | 0.13 | 0.00 | 0.49 | 0.49 | 0.02 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.7 |
| Lane LOS | | | | | | | | A |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | 8.7 |
| Approach LOS | | | | | | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 45.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|-------|------|------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 942 | 529 | 396 | 1048 | 0 | 0 | 0 | 458 | 0 | 0 | 475 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1024 | 575 | 430 | 1139 | 0 | 0 | 0 | 498 | 0 | 0 | 516 | |
| RTOR Reduction (vph) | 0 | 0 | 338 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 171 | |
| Lane Group Flow (vph) | 0 | 1024 | 237 | 430 | 1139 | 0 | 0 | 0 | 498 | 0 | 0 | 345 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 29.9 | 29.9 | 13.0 | 49.9 | | | | 16.1 | | | 16.1 | |
| Effective Green, g (s) | | 29.9 | 29.9 | 13.0 | 49.9 | | | | 16.1 | | | 16.1 | |
| Actuated g/C Ratio | | 0.41 | 0.41 | 0.18 | 0.69 | | | | 0.22 | | | 0.22 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1383 | 1089 | 563 | 2309 | | | | 647 | | | 618 | |
| v/s Ratio Prot | | c0.31 | | c0.14 | 0.34 | | | | c0.17 | | | 0.12 | |
| v/s Ratio Perm | | | 0.09 | | | | | | | | | | |
| v/c Ratio | | 0.74 | 0.22 | 0.76 | 0.49 | | | | 0.77 | | | 0.56 | |
| Uniform Delay, d1 | | 18.0 | 13.8 | 28.3 | 5.3 | | | | 26.5 | | | 25.0 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 2.2 | 0.1 | 6.1 | 0.2 | | | | 5.5 | | | 1.1 | |
| Delay (s) | | 20.2 | 13.9 | 34.4 | 5.5 | | | | 32.0 | | | 26.1 | |
| Level of Service | | C | B | C | A | | | | C | | | C | |
| Approach Delay (s) | | 17.9 | | | 13.4 | | | 32.0 | | | 26.1 | | |
| Approach LOS | | B | | | B | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 18.9 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.75 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 72.5 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 52.7% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps

Baseline AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|-------|------|-------|-------|---------------------------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 569 | 0 | 717 | 426 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 618 | 0 | 779 | 463 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 100 | 0 | 0 |
| Lane Group Flow (vph) | 618 | 0 | 779 | 363 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 23.0 | | 19.6 | 19.6 | | |
| Effective Green, g (s) | 23.0 | | 19.6 | 19.6 | | |
| Actuated g/C Ratio | 0.45 | | 0.38 | 0.38 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 722 | | 1274 | 581 | | |
| v/s Ratio Prot | c0.38 | | 0.23 | | | |
| v/s Ratio Perm | | | | c0.24 | | |
| v/c Ratio | 0.86 | | 0.61 | 0.63 | | |
| Uniform Delay, d1 | 12.8 | | 12.9 | 13.0 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 9.8 | | 0.9 | 2.1 | | |
| Delay (s) | 22.6 | | 13.8 | 15.1 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 22.6 | 14.3 | | 0.0 | |
| Approach LOS | | C | B | | A | |
| Intersection Summary | | | | | | |
| HCM 2000 Control Delay | | | 17.1 | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.75 | | | |
| Actuated Cycle Length (s) | | | 51.6 | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 65.4% | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | |
| c Critical Lane Group | | | | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

Baseline AM


























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | ↘ | ↑↑↑ | ↗ | ↘ | ↑↑↑ | | ↘ | ↗ | ↗ | | ↗ | ↗ |
| Volume (vph) | 114 | 752 | 404 | 127 | 807 | 30 | 199 | 35 | 72 | 18 | 85 | 107 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4625 | | 1539 | 1565 | 1513 | | 1750 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4625 | | 1539 | 1565 | 1513 | | 1750 | 1489 |
| 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) | 124 | 817 | 439 | 138 | 877 | 33 | 216 | 38 | 78 | 20 | 92 | 116 |
| RTOR Reduction (vph) | 0 | 0 | 268 | 0 | 4 | 0 | 0 | 0 | 65 | 0 | 0 | 104 |
| Lane Group Flow (vph) | 124 | 817 | 171 | 138 | 906 | 0 | 125 | 129 | 13 | 0 | 112 | 12 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 12.2 | 36.9 | 36.9 | 12.8 | 37.5 | | 16.1 | 16.1 | 16.1 | | 10.0 | 10.0 |
| Effective Green, g (s) | 12.2 | 36.9 | 36.9 | 12.8 | 37.5 | | 16.1 | 16.1 | 16.1 | | 10.0 | 10.0 |
| Actuated g/C Ratio | 0.13 | 0.39 | 0.39 | 0.13 | 0.39 | | 0.17 | 0.17 | 0.17 | | 0.11 | 0.11 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 208 | 1808 | 594 | 226 | 1825 | | 260 | 265 | 256 | | 184 | 156 |
| v/s Ratio Prot | 0.08 | 0.18 | | c0.08 | c0.20 | | 0.08 | c0.08 | | | c0.06 | 0.01 |
| v/s Ratio Perm | | | 0.11 | | | | | | 0.01 | | | |
| v/c Ratio | 0.60 | 0.45 | 0.29 | 0.61 | 0.50 | | 0.48 | 0.49 | 0.05 | | 0.61 | 0.08 |
| Uniform Delay, d1 | 39.1 | 21.5 | 20.0 | 38.8 | 21.6 | | 35.7 | 35.7 | 33.1 | | 40.6 | 38.3 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.99 | 0.70 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 5.3 | 0.8 | 1.2 | 5.1 | 0.9 | | 1.9 | 1.9 | 0.1 | | 6.5 | 0.3 |
| Delay (s) | 44.4 | 22.4 | 21.2 | 43.6 | 16.1 | | 37.6 | 37.6 | 33.2 | | 47.1 | 38.6 |
| Level of Service | D | C | C | D | B | | D | D | C | | D | D |
| Approach Delay (s) | | 24.0 | | | 19.8 | | | 36.6 | | | 42.8 | |
| Approach LOS | | C | | | B | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 25.3 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.53 | C |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 54.0% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

Baseline AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  | |  |  |  |  |  |  |
| Volume (vph) | 54 | 532 | 131 | 169 | 666 | 14 | 166 | 165 | 210 | 20 | 162 | 43 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3278 | | 3143 | 1705 | 1660 | 3204 | 3124 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3278 | | 3143 | 1705 | 1660 | 3204 | 3124 | |
| 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) | 59 | 578 | 142 | 184 | 724 | 15 | 180 | 179 | 228 | 22 | 176 | 47 |
| RTOR Reduction (vph) | 0 | 0 | 91 | 0 | 1 | 0 | 0 | 0 | 172 | 0 | 28 | 0 |
| Lane Group Flow (vph) | 59 | 578 | 51 | 184 | 738 | 0 | 180 | 179 | 56 | 22 | 195 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 7.0 | 34.4 | 34.4 | 16.1 | 43.5 | | 11.3 | 23.4 | 23.4 | 3.1 | 15.6 | |
| Effective Green, g (s) | 7.0 | 34.4 | 34.4 | 16.1 | 43.5 | | 11.3 | 23.4 | 23.4 | 3.1 | 15.6 | |
| Actuated g/C Ratio | 0.07 | 0.36 | 0.36 | 0.17 | 0.46 | | 0.12 | 0.25 | 0.25 | 0.03 | 0.16 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 119 | 1196 | 543 | 279 | 1500 | | 373 | 419 | 408 | 104 | 512 | |
| v/s Ratio Prot | 0.04 | 0.17 | | c0.11 | c0.23 | | c0.06 | c0.10 | | 0.01 | 0.06 | |
| v/s Ratio Perm | | | 0.03 | | | | | | 0.03 | | | |
| v/c Ratio | 0.50 | 0.48 | 0.09 | 0.66 | 0.49 | | 0.48 | 0.43 | 0.14 | 0.21 | 0.38 | |
| Uniform Delay, d1 | 42.3 | 23.4 | 20.0 | 36.9 | 18.0 | | 39.1 | 30.2 | 27.9 | 44.8 | 35.4 | |
| Progression Factor | 0.87 | 0.82 | 2.48 | 1.23 | 0.61 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.1 | 1.3 | 0.3 | 1.8 | 0.3 | | 1.3 | 1.0 | 0.2 | 1.4 | 0.6 | |
| Delay (s) | 38.0 | 20.5 | 50.0 | 47.3 | 11.3 | | 40.5 | 31.1 | 28.1 | 46.1 | 36.0 | |
| Level of Service | D | C | D | D | B | | D | C | C | D | D | |
| Approach Delay (s) | | 27.2 | | | 18.5 | | | 32.8 | | | 36.9 | |
| Approach LOS | | C | | | B | | | C | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 26.3 | HCM 2000 Level of Service | | | | C | | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.54 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | Sum of lost time (s) | | | | 18.0 | | | | |
| Intersection Capacity Utilization | | | 51.7% | ICU Level of Service | | | | A | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: San Leandro Blvd & Marina Blvd

Baseline AM

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|------|-------|------|------|------|-------|------|------|------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 243 | 196 | 309 | 4 | 271 | 29 | 402 | 833 | 7 | 39 | 444 | 187 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 | |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1737 | 1479 | 1652 | 3534 | | 1652 | 3140 | | |
| Flt Permitted | 0.22 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 379 | 1739 | 1770 | | 1732 | 1479 | 1652 | 3534 | | 1652 | 3140 | | |
| 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) | 264 | 213 | 336 | 4 | 295 | 32 | 437 | 905 | 8 | 42 | 483 | 203 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 1 | 0 | 0 | 49 | 0 | |
| Lane Group Flow (vph) | 264 | 213 | 336 | 0 | 299 | 7 | 437 | 912 | 0 | 42 | 637 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | | |
| Actuated Green, G (s) | 37.9 | 37.9 | 95.0 | | 20.0 | 20.0 | 23.1 | 37.1 | | 5.5 | 19.0 | | |
| Effective Green, g (s) | 37.9 | 37.9 | 95.0 | | 20.0 | 20.0 | 23.1 | 37.1 | | 5.5 | 19.0 | | |
| Actuated g/C Ratio | 0.40 | 0.40 | 1.00 | | 0.21 | 0.21 | 0.24 | 0.39 | | 0.06 | 0.20 | | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | | |
| Lane Grp Cap (vph) | 337 | 693 | 1770 | | 364 | 311 | 401 | 1380 | | 95 | 628 | | |
| v/s Ratio Prot | c0.11 | 0.12 | | | | | c0.26 | 0.26 | | 0.03 | c0.20 | | |
| v/s Ratio Perm | c0.20 | | 0.19 | | 0.17 | 0.00 | | | | | | | |
| v/c Ratio | 0.78 | 0.31 | 0.19 | | 0.82 | 0.02 | 1.09 | 0.66 | | 0.44 | 1.01 | | |
| Uniform Delay, d1 | 22.0 | 19.6 | 0.0 | | 35.8 | 29.7 | 36.0 | 23.8 | | 43.3 | 38.0 | | |
| Progression Factor | 0.86 | 0.76 | 1.00 | | 1.00 | 1.00 | 1.12 | 0.71 | | 0.86 | 0.87 | | |
| Incremental Delay, d2 | 10.5 | 0.3 | 0.2 | | 14.4 | 0.0 | 70.4 | 2.4 | | 3.1 | 38.7 | | |
| Delay (s) | 29.4 | 15.1 | 0.2 | | 50.2 | 29.8 | 110.5 | 19.3 | | 40.4 | 71.8 | | |
| Level of Service | C | B | A | | D | C | F | B | | D | E | | |
| Approach Delay (s) | | 13.6 | | | 48.2 | | | 48.8 | | | 69.9 | | |
| Approach LOS | | B | | | D | | | D | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 44.7 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.96 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 86.9% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

Baseline AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 16 | 8 | 16 | 51 | 106 | 14 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 9 | 17 | 55 | 115 | 15 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 26 | 73 | 130 | | | |
| Volume Left (vph) | 17 | 17 | 0 | | | |
| Volume Right (vph) | 9 | 0 | 15 | | | |
| Hadj (s) | -0.03 | 0.08 | -0.04 | | | |
| Departure Headway (s) | 4.3 | 4.2 | 4.0 | | | |
| Degree Utilization, x | 0.03 | 0.08 | 0.14 | | | |
| Capacity (veh/h) | 796 | 844 | 889 | | | |
| Control Delay (s) | 7.4 | 7.5 | 7.7 | | | |
| Approach Delay (s) | 7.4 | 7.5 | 7.7 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.6 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 20.2% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

Baseline AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 7 | 3 | 5 | 56 | 101 | 11 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 8 | 3 | 5 | 61 | 110 | 12 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 11 | 66 | 122 | | | |
| Volume Left (vph) | 8 | 5 | 0 | | | |
| Volume Right (vph) | 3 | 0 | 12 | | | |
| Hadj (s) | -0.01 | 0.05 | -0.02 | | | |
| Departure Headway (s) | 4.3 | 4.1 | 4.0 | | | |
| Degree Utilization, x | 0.01 | 0.08 | 0.13 | | | |
| Capacity (veh/h) | 799 | 862 | 899 | | | |
| Control Delay (s) | 7.3 | 7.4 | 7.6 | | | |
| Approach Delay (s) | 7.3 | 7.4 | 7.6 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.5 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 17.1% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive



















Baseline AM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|------|-------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 73 | 26 | 60 | 48 | 16 | 88 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 79 | 28 | 65 | 52 | 17 | 96 |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 108 | 117 | 113 | | | |
| Volume Left (vph) | 79 | 0 | 17 | | | |
| Volume Right (vph) | 28 | 52 | 0 | | | |
| Hadj (s) | 0.02 | -0.23 | 0.06 | | | |
| Departure Headway (s) | 4.4 | 4.0 | 4.3 | | | |
| Degree Utilization, x | 0.13 | 0.13 | 0.14 | | | |
| Capacity (veh/h) | 774 | 857 | 805 | | | |
| Control Delay (s) | 8.1 | 7.7 | 8.0 | | | |
| Approach Delay (s) | 8.1 | 7.7 | 8.0 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.9 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 24.5% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Baseline AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 12 | 122 | 9 | 14 | 78 | 34 | 9 | 62 | 46 | 30 | 17 | 8 |
| 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 |
| Hourly flow rate (vph) | 13 | 133 | 10 | 15 | 85 | 37 | 10 | 67 | 50 | 33 | 18 | 9 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 13 | 142 | 137 | 127 | 60 | | | | | | | |
| Volume Left (vph) | 13 | 0 | 15 | 10 | 33 | | | | | | | |
| Volume Right (vph) | 0 | 10 | 37 | 50 | 9 | | | | | | | |
| Hadj (s) | 0.53 | -0.01 | -0.11 | -0.19 | 0.06 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.1 | 4.5 | 4.5 | 4.8 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.20 | 0.17 | 0.16 | 0.08 | | | | | | | |
| Capacity (veh/h) | 618 | 680 | 748 | 749 | 688 | | | | | | | |
| Control Delay (s) | 7.5 | 8.1 | 8.5 | 8.4 | 8.2 | | | | | | | |
| Approach Delay (s) | 8.1 | | 8.5 | 8.4 | 8.2 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.3 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 33.6% | | ICU Level of Service | | A | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↖ | ↗ | ↖ | ↗ | ↖ | ↖ | ↗ | ↗ | ↖ | ↗ | ↖ |
| Volume (vph) | 82 | 91 | 27 | 29 | 74 | 160 | 32 | 525 | 54 | 116 | 230 | 35 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1692 | 1259 | 1620 | 1739 | 1316 | 1711 | 3028 | | 1620 | 3014 | |
| Flt Permitted | | 0.81 | 1.00 | 0.63 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1401 | 1259 | 1080 | 1739 | 1316 | 1711 | 3028 | | 1620 | 3014 | |
| 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) | 89 | 99 | 29 | 32 | 80 | 174 | 35 | 571 | 59 | 126 | 250 | 38 |
| RTOR Reduction (vph) | 0 | 0 | 22 | 0 | 0 | 132 | 0 | 10 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 0 | 188 | 7 | 32 | 80 | 42 | 35 | 620 | 0 | 126 | 275 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 13.9 | 13.9 | 13.9 | 13.9 | 13.9 | 2.6 | 20.7 | | 8.2 | 26.3 | |
| Effective Green, g (s) | | 13.9 | 13.9 | 13.9 | 13.9 | 13.9 | 2.6 | 20.7 | | 8.2 | 26.3 | |
| Actuated g/C Ratio | | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.04 | 0.36 | | 0.14 | 0.46 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 336 | 302 | 259 | 418 | 316 | 76 | 1084 | | 229 | 1371 | |
| v/s Ratio Prot | | | | | 0.05 | | 0.02 | c0.20 | | c0.08 | 0.09 | |
| v/s Ratio Perm | | c0.13 | 0.01 | 0.03 | | 0.03 | | | | | | |
| v/c Ratio | | 0.56 | 0.02 | 0.12 | 0.19 | 0.13 | 0.46 | 0.57 | | 0.55 | 0.20 | |
| Uniform Delay, d1 | | 19.3 | 16.8 | 17.2 | 17.5 | 17.2 | 26.9 | 15.0 | | 23.1 | 9.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 2.0 | 0.0 | 0.2 | 0.2 | 0.2 | 4.4 | 0.9 | | 2.8 | 0.1 | |
| Delay (s) | | 21.3 | 16.8 | 17.4 | 17.7 | 17.4 | 31.3 | 15.9 | | 25.9 | 9.5 | |
| Level of Service | | C | B | B | B | B | C | B | | C | A | |
| Approach Delay (s) | | 20.7 | | | 17.5 | | | 16.7 | | | 14.5 | |
| Approach LOS | | C | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.56 | | |
| Actuated Cycle Length (s) | 57.8 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 53.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|-------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 125 | 138 | 48 | 127 | 162 | 52 | 85 | 600 | 123 | 30 | 368 | 61 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3144 | | 1593 | 3154 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3144 | | 1593 | 3154 | |
| 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) | 136 | 150 | 52 | 138 | 176 | 57 | 92 | 652 | 134 | 33 | 400 | 66 |
| RTOR Reduction (vph) | 0 | 0 | 42 | 0 | 0 | 46 | 0 | 14 | 0 | 0 | 12 | 0 |
| Lane Group Flow (vph) | 136 | 150 | 10 | 138 | 176 | 11 | 92 | 772 | 0 | 33 | 454 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 14.4 | 22.0 | 22.0 | 14.5 | 22.1 | 22.1 | 9.9 | 48.5 | | 6.0 | 44.6 | |
| Effective Green, g (s) | 14.4 | 22.0 | 22.0 | 14.5 | 22.1 | 22.1 | 9.9 | 48.5 | | 6.0 | 44.6 | |
| Actuated g/C Ratio | 0.13 | 0.20 | 0.20 | 0.13 | 0.20 | 0.20 | 0.09 | 0.44 | | 0.05 | 0.41 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 206 | 369 | 261 | 209 | 374 | 271 | 148 | 1386 | | 86 | 1278 | |
| v/s Ratio Prot | c0.09 | 0.08 | | c0.09 | c0.09 | | 0.06 | c0.25 | | 0.02 | c0.14 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.66 | 0.41 | 0.04 | 0.66 | 0.47 | 0.04 | 0.62 | 0.56 | | 0.38 | 0.36 | |
| Uniform Delay, d1 | 45.5 | 38.3 | 35.5 | 45.4 | 38.8 | 35.4 | 48.2 | 22.8 | | 50.2 | 22.7 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.06 | 0.94 | | 1.07 | 0.94 | |
| Incremental Delay, d2 | 8.4 | 1.0 | 0.1 | 8.3 | 1.3 | 0.1 | 8.6 | 1.6 | | 3.8 | 0.8 | |
| Delay (s) | 53.9 | 39.3 | 35.6 | 53.7 | 40.1 | 35.5 | 59.9 | 23.0 | | 57.3 | 22.2 | |
| Level of Service | D | D | D | D | D | D | E | C | | E | C | |
| Approach Delay (s) | | 44.6 | | | 44.4 | | | 26.9 | | | 24.5 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 32.3 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.57 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 65.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|--------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 27 | 221 | 7 | 6 | 347 | 203 | 2 | 0 | 0 | 38 | 0 | 22 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.95 | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 1854 | | | 3343 | | | 1770 | | | 1716 | |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.93 | | | 0.81 | |
| Satd. Flow (perm) | 1770 | 1854 | | | 3185 | | | 1736 | | | 1429 | |
| 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) | 29 | 240 | 8 | 7 | 377 | 221 | 2 | 0 | 0 | 41 | 0 | 24 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 91 | 0 | 0 | 0 | 0 | 0 | 57 | 0 |
| Lane Group Flow (vph) | 29 | 247 | 0 | 0 | 514 | 0 | 0 | 2 | 0 | 0 | 8 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 0.9 | 35.3 | | | 29.5 | | | 5.8 | | | 5.8 | |
| Effective Green, g (s) | 0.9 | 35.3 | | | 29.5 | | | 5.8 | | | 5.8 | |
| Actuated g/C Ratio | 0.02 | 0.71 | | | 0.59 | | | 0.12 | | | 0.12 | |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Grp Cap (vph) | 31 | 1308 | | | 1879 | | | 201 | | | 165 | |
| v/s Ratio Prot | c0.02 | 0.13 | | | | | | | | | | |
| v/s Ratio Perm | | | | | c0.16 | | | 0.00 | | | c0.01 | |
| v/c Ratio | 0.94 | 0.19 | | | 1.00dr | | | 0.01 | | | 0.05 | |
| Uniform Delay, d1 | 24.5 | 2.5 | | | 5.0 | | | 19.6 | | | 19.6 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 132.4 | 0.1 | | | 0.1 | | | 0.0 | | | 0.2 | |
| Delay (s) | 156.9 | 2.6 | | | 5.1 | | | 19.6 | | | 19.8 | |
| Level of Service | F | A | | | A | | | B | | | B | |
| Approach Delay (s) | | 18.7 | | | 5.1 | | | 19.6 | | | 19.8 | |
| Approach LOS | | B | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 10.1 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.25 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 33.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

26: Miller St & Fairway Dr/Aladdin Ave

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 23 | 317 | 31 | 72 | 598 | 187 | 12 | 0 | 12 | 37 | 2 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.96 | | 1.00 | 0.85 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1834 | | 1593 | 1916 | | 1711 | 1531 | | 1770 | 1606 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1834 | | 1593 | 1916 | | 1801 | 1531 | | 1770 | 1606 | |
| 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) | 25 | 345 | 34 | 78 | 650 | 203 | 13 | 0 | 13 | 40 | 2 | 23 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 12 | 0 | 0 | 20 | 0 |
| Lane Group Flow (vph) | 25 | 377 | 0 | 78 | 847 | 0 | 13 | 1 | 0 | 40 | 5 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 2.1 | 40.7 | | 5.5 | 44.1 | | 3.4 | 3.4 | | 2.4 | 9.8 | |
| Effective Green, g (s) | 2.1 | 40.7 | | 5.5 | 44.1 | | 3.4 | 3.4 | | 2.4 | 9.8 | |
| Actuated g/C Ratio | 0.03 | 0.58 | | 0.08 | 0.63 | | 0.05 | 0.05 | | 0.03 | 0.14 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 53 | 1069 | | 125 | 1210 | | 87 | 74 | | 60 | 225 | |
| v/s Ratio Prot | 0.01 | 0.21 | | c0.05 | c0.44 | | | 0.00 | | c0.02 | 0.00 | |
| v/s Ratio Perm | | | | | | | c0.01 | | | | | |
| v/c Ratio | 0.47 | 0.35 | | 0.62 | 0.70 | | 0.15 | 0.01 | | 0.67 | 0.02 | |
| Uniform Delay, d1 | 33.3 | 7.6 | | 31.1 | 8.5 | | 31.8 | 31.6 | | 33.3 | 25.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.4 | 0.3 | | 6.8 | 1.9 | | 1.1 | 0.1 | | 19.5 | 0.1 | |
| Delay (s) | 35.7 | 7.9 | | 37.9 | 10.4 | | 32.9 | 31.7 | | 52.8 | 25.9 | |
| Level of Service | D | A | | D | B | | C | C | | D | C | |
| Approach Delay (s) | | 9.6 | | | 12.7 | | | 32.3 | | | 42.5 | |
| Approach LOS | | A | | | B | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 13.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.69 | | |
| Actuated Cycle Length (s) | 69.8 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 66.4% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

27: Teagarden St & Aladdin Ave

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 41 | 212 | 50 | 10 | 517 | 40 | 64 | 111 | 11 | 75 | 152 | 193 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1965 | | 1711 | 1701 | | 1652 | 1833 | | 1645 | 1740 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.34 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1965 | | 1711 | 1701 | | 584 | 1833 | | 1163 | 1740 | |
| 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) | 45 | 230 | 54 | 11 | 562 | 43 | 70 | 121 | 12 | 82 | 165 | 210 |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 3 | 0 | 0 | 5 | 0 | 0 | 66 | 0 |
| Lane Group Flow (vph) | 45 | 273 | 0 | 11 | 602 | 0 | 70 | 128 | 0 | 82 | 309 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 14 | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 3.1 | 25.8 | | 1.2 | 23.9 | | 16.0 | 16.0 | | 16.0 | 16.0 | |
| Effective Green, g (s) | 3.1 | 25.8 | | 1.2 | 23.9 | | 16.0 | 16.0 | | 16.0 | 16.0 | |
| Actuated g/C Ratio | 0.06 | 0.46 | | 0.02 | 0.43 | | 0.29 | 0.29 | | 0.29 | 0.29 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 94 | 905 | | 36 | 725 | | 166 | 523 | | 332 | 497 | |
| v/s Ratio Prot | c0.03 | 0.14 | | 0.01 | c0.35 | | | 0.07 | | | c0.18 | |
| v/s Ratio Perm | | | | | | | 0.12 | | | 0.07 | | |
| v/c Ratio | 0.48 | 0.30 | | 0.31 | 0.83 | | 0.42 | 0.24 | | 0.25 | 0.62 | |
| Uniform Delay, d1 | 25.7 | 9.5 | | 27.0 | 14.2 | | 16.2 | 15.4 | | 15.4 | 17.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.2 | 0.3 | | 6.5 | 8.2 | | 2.4 | 0.3 | | 0.5 | 2.7 | |
| Delay (s) | 30.8 | 9.7 | | 33.5 | 22.4 | | 18.6 | 15.7 | | 15.9 | 20.1 | |
| Level of Service | C | A | | C | C | | B | B | | B | C | |
| Approach Delay (s) | | 12.6 | | | 22.6 | | | 16.7 | | | 19.4 | |
| Approach LOS | | B | | | C | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.9 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.72 | | |
| Actuated Cycle Length (s) | 56.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 70.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 179 | 17 | 51 | 2 | 12 | 10 | 410 | 434 | 15 | 7 | 186 | 177 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.89 | | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1568 | | 1652 | 1596 | | 1652 | 1705 | 1450 | 1711 | 3140 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1568 | | 1652 | 1596 | | 1652 | 1705 | 1450 | 1711 | 3140 | |
| 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) | 195 | 18 | 55 | 2 | 13 | 11 | 446 | 472 | 16 | 8 | 202 | 192 |
| RTOR Reduction (vph) | 0 | 36 | 0 | 0 | 9 | 0 | 0 | 0 | 10 | 0 | 150 | 0 |
| Lane Group Flow (vph) | 195 | 37 | 0 | 2 | 15 | 0 | 446 | 472 | 6 | 8 | 244 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 13.8 | 27.0 | | 1.2 | 14.4 | | 15.5 | 31.3 | 31.3 | 1.3 | 17.1 | |
| Effective Green, g (s) | 13.8 | 27.0 | | 1.2 | 14.4 | | 15.5 | 31.3 | 31.3 | 1.3 | 17.1 | |
| Actuated g/C Ratio | 0.18 | 0.35 | | 0.02 | 0.19 | | 0.20 | 0.40 | 0.40 | 0.02 | 0.22 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 294 | 547 | | 25 | 297 | | 331 | 690 | 587 | 28 | 694 | |
| v/s Ratio Prot | c0.12 | c0.02 | | 0.00 | 0.01 | | c0.27 | c0.28 | | 0.00 | 0.08 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 0.66 | 0.07 | | 0.08 | 0.05 | | 1.35 | 0.68 | 0.01 | 0.29 | 0.35 | |
| Uniform Delay, d1 | 29.6 | 16.8 | | 37.5 | 25.8 | | 30.9 | 18.9 | 13.7 | 37.5 | 25.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.3 | 0.1 | | 2.9 | 0.1 | | 175.2 | 3.6 | 0.0 | 11.4 | 0.6 | |
| Delay (s) | 36.9 | 16.9 | | 40.4 | 26.0 | | 206.1 | 22.5 | 13.8 | 49.0 | 26.1 | |
| Level of Service | D | B | | D | C | | F | C | B | D | C | |
| Approach Delay (s) | | 31.4 | | | 27.1 | | | 110.0 | | | 26.5 | |
| Approach LOS | | C | | | C | | | F | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 75.2 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.73 | | |
| Actuated Cycle Length (s) | 77.3 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 61.0% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

Baseline AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↗ | ↖ | ↕ | | ↖ | ↕ | |
| Volume (vph) | 3 | 2 | 0 | 5 | 0 | 15 | 4 | 886 | 9 | 40 | 882 | 5 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1808 | | | 1562 | 1397 | 1649 | 4945 | | 1617 | 3468 | |
| Flt Permitted | | 0.86 | | | 0.75 | 1.00 | 0.29 | 1.00 | | 0.28 | 1.00 | |
| Satd. Flow (perm) | | 1606 | | | 1241 | 1397 | 507 | 4945 | | 480 | 3468 | |
| 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) | 3 | 2 | 0 | 5 | 0 | 16 | 4 | 963 | 10 | 43 | 959 | 5 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 5 | 0 | 0 | 5 | 1 | 4 | 973 | 0 | 43 | 964 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Effective Green, g (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | 0.06 | 0.86 | 0.86 | | 0.86 | 0.86 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 103 | | | 80 | 90 | 434 | 4239 | | 411 | 2973 | |
| v/s Ratio Prot | | | | | | | | 0.20 | | | c0.28 | |
| v/s Ratio Perm | | 0.00 | | | c0.00 | 0.00 | 0.01 | | | 0.09 | | |
| v/c Ratio | | 0.05 | | | 0.06 | 0.01 | 0.01 | 0.23 | | 0.10 | 0.32 | |
| Uniform Delay, d1 | | 48.3 | | | 48.3 | 48.2 | 1.1 | 1.4 | | 1.2 | 1.6 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.89 | 1.97 | | 0.05 | 0.06 | |
| Incremental Delay, d2 | | 0.2 | | | 0.3 | 0.1 | 0.0 | 0.1 | | 0.3 | 0.2 | |
| Delay (s) | | 48.5 | | | 48.7 | 48.2 | 2.2 | 2.9 | | 0.4 | 0.3 | |
| Level of Service | | D | | | D | D | A | A | | A | A | |
| Approach Delay (s) | | 48.5 | | | 48.3 | | | 2.9 | | | 0.3 | |
| Approach LOS | | D | | | D | | | A | | | A | |






















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 2.2 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.31 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 43.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Merced Street & Republic Ave

Baseline AM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  |  | |
| Volume (vph) | 32 | 2 | 7 | 20 | 3 | 152 | 9 | 769 | 45 | 271 | 733 | 7 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | |
| Flt Protected | | 0.96 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1712 | | | 1784 | 2787 | 1736 | 3471 | 1583 | 3433 | 3465 | | |
| Flt Permitted | | 0.77 | | | 0.76 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1362 | | | 1413 | 2787 | 1736 | 3471 | 1583 | 3433 | 3465 | | |
| 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) | 35 | 2 | 8 | 22 | 3 | 165 | 10 | 836 | 49 | 295 | 797 | 8 | |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 147 | 0 | 0 | 18 | 0 | 0 | 0 | |
| Lane Group Flow (vph) | 0 | 38 | 0 | 0 | 25 | 18 | 10 | 836 | 31 | 295 | 805 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | |
| Actuated Green, G (s) | | 12.1 | | | 12.1 | 12.1 | 1.2 | 69.6 | 69.6 | 14.8 | | 83.2 | |
| Effective Green, g (s) | | 12.1 | | | 12.1 | 12.1 | 1.2 | 69.6 | 69.6 | 14.8 | | 83.2 | |
| Actuated g/C Ratio | | 0.11 | | | 0.11 | 0.11 | 0.01 | 0.63 | 0.63 | 0.13 | | 0.76 | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | | 149 | | | 155 | 306 | 18 | 2196 | 1001 | 461 | | 2620 | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.24 | | c0.09 | | 0.23 | |
| v/s Ratio Perm | | c0.03 | | | 0.02 | 0.01 | | | 0.02 | | | | |
| v/c Ratio | | 0.25 | | | 0.16 | 0.06 | 0.56 | 0.38 | 0.03 | 0.64 | | 0.31 | |
| Uniform Delay, d1 | | 44.8 | | | 44.4 | 43.9 | 54.1 | 9.8 | 7.6 | 45.1 | | 4.3 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.86 | 1.40 | 1.00 | 1.18 | | 0.68 | |
| Incremental Delay, d2 | | 0.9 | | | 0.5 | 0.1 | 28.8 | 0.4 | 0.1 | 2.8 | | 0.3 | |
| Delay (s) | | 45.7 | | | 44.8 | 43.9 | 75.3 | 14.1 | 7.6 | 55.9 | | 3.2 | |
| Level of Service | | D | | | D | D | E | B | A | E | | A | |
| Approach Delay (s) | | 45.7 | | | 44.1 | | | 14.5 | | | | 17.3 | |
| Approach LOS | | D | | | D | | | B | | | | B | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 19.0 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.40 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 49.2% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

Baseline AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 14 | 4 | 30 | 798 | 470 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3189 | |
| Flt Permitted | 0.95 | 1.00 | 0.44 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 763 | 3240 | 3189 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 15 | 4 | 33 | 867 | 511 | 57 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 15 | 0 | 33 | 867 | 560 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Effective Green, g (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Actuated g/C Ratio | 0.08 | 0.08 | 0.76 | 0.76 | 0.76 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 129 | 103 | 578 | 2456 | 2417 | |
| v/s Ratio Prot | c0.01 | | | c0.27 | 0.18 | |
| v/s Ratio Perm | | 0.00 | 0.04 | | | |
| v/c Ratio | 0.12 | 0.00 | 0.06 | 0.35 | 0.23 | |
| Uniform Delay, d1 | 23.6 | 23.4 | 1.7 | 2.2 | 2.0 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.48 | |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.2 | 0.4 | 0.2 | |
| Delay (s) | 24.0 | 23.4 | 1.9 | 2.6 | 1.1 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.6 | 1.1 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 2.3 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.33 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
























c Critical Lane Group

Baseline PM

HCM Signalized Intersection Capacity Analysis

Baseline PM

1: Doolittle Dr & Davis St

| |  |  |  |  |  |  |  |  |  |  |  |  | | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|----------------------|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | | |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  | | |
| Volume (vph) | 44 | 82 | 21 | 137 | 72 | 455 | 13 | 380 | 215 | 612 | 760 | 20 | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (prot) | 1678 | 3084 | | 3255 | 1689 | 1493 | 1620 | 4655 | 1434 | 3143 | 3225 | | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (perm) | 1678 | 3084 | | 3255 | 1689 | 1493 | 1620 | 4655 | 1434 | 3143 | 3225 | | | |
| 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) | 48 | 89 | 23 | 149 | 78 | 495 | 14 | 413 | 234 | 665 | 826 | 22 | | |
| RTOR Reduction (vph) | 0 | 20 | 0 | 0 | 0 | 175 | 0 | 0 | 144 | 0 | 1 | 0 | | |
| Lane Group Flow (vph) | 48 | 92 | 0 | 149 | 78 | 320 | 14 | 413 | 90 | 665 | 847 | 0 | | |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | 5 | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | | |
| Actuated Green, G (s) | 4.3 | 9.9 | | 8.9 | 14.5 | 35.3 | 4.0 | 19.6 | 28.5 | 20.8 | 36.4 | | | |
| Effective Green, g (s) | 4.3 | 9.9 | | 8.9 | 14.5 | 35.3 | 4.0 | 19.6 | 28.5 | 20.8 | 36.4 | | | |
| Actuated g/C Ratio | 0.06 | 0.13 | | 0.12 | 0.19 | 0.47 | 0.05 | 0.26 | 0.38 | 0.28 | 0.49 | | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | | |
| Lane Grp Cap (vph) | 96 | 409 | | 388 | 328 | 707 | 86 | 1224 | 548 | 877 | 1575 | | | |
| v/s Ratio Prot | c0.03 | 0.03 | | c0.05 | 0.05 | c0.13 | 0.01 | c0.09 | 0.02 | c0.21 | c0.26 | | | |
| v/s Ratio Perm | | | | | | 0.09 | | | 0.04 | | | | | |
| v/c Ratio | 0.50 | 0.23 | | 0.38 | 0.24 | 0.45 | 0.16 | 0.34 | 0.16 | 0.76 | 0.54 | | | |
| Uniform Delay, d1 | 34.1 | 28.9 | | 30.3 | 25.3 | 13.1 | 33.7 | 22.2 | 15.1 | 24.6 | 13.2 | | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 1.5 | 0.3 | | 0.2 | 0.4 | 0.2 | 0.3 | 0.2 | 0.1 | 3.4 | 0.6 | | | |
| Delay (s) | 35.5 | 29.2 | | 30.5 | 25.7 | 13.3 | 34.0 | 22.4 | 15.2 | 27.9 | 13.8 | | | |
| Level of Service | D | C | | C | C | B | C | C | B | C | B | | | |
| Approach Delay (s) | | 31.1 | | | 18.2 | | | 20.1 | | | 20.0 | | | |
| Approach LOS | | C | | | B | | | C | | | B | | | |
| Intersection Summary | | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.2 | | | | | | | | | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | | | 0.58 | | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 74.5 | | | | | | | | 15.3 | | | |
| Intersection Capacity Utilization | | | 51.8% | | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

2: Phillips Ln & Davis St

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|-------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 137 | 837 | 18 | 20 | 514 | 414 | 53 | 13 | 271 | 453 | 3 | 128 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | 0.98 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.97 | 0.85 | 1.00 | 0.86 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3168 | | 1620 | 2971 | 1318 | 1651 | 1442 | | 3143 | 1401 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.23 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3168 | | 1620 | 2971 | 1318 | 404 | 1442 | | 3143 | 1401 | |
| 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) | 149 | 910 | 20 | 22 | 559 | 450 | 58 | 14 | 295 | 492 | 3 | 139 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 17 | 133 | 0 | 191 | 0 | 0 | 106 | 0 |
| Lane Group Flow (vph) | 149 | 929 | 0 | 22 | 682 | 177 | 58 | 118 | 0 | 492 | 36 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 18 | 21 | | | | | 21 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 14.9 | 45.0 | | 4.7 | 34.8 | 59.9 | 17.2 | 17.2 | | 25.1 | 25.1 | |
| Effective Green, g (s) | 14.9 | 45.0 | | 4.7 | 34.8 | 59.9 | 17.2 | 17.2 | | 25.1 | 25.1 | |
| Actuated g/C Ratio | 0.14 | 0.43 | | 0.04 | 0.33 | 0.57 | 0.16 | 0.16 | | 0.24 | 0.24 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 229 | 1357 | | 72 | 984 | 751 | 66 | 236 | | 751 | 334 | |
| v/s Ratio Prot | c0.09 | c0.29 | | 0.01 | 0.23 | 0.06 | | 0.08 | | c0.16 | | |
| v/s Ratio Perm | | | | | | 0.08 | c0.14 | | | | | 0.03 |
| v/c Ratio | 0.65 | 0.68 | | 0.31 | 0.69 | 0.24 | 0.88 | 0.50 | | 0.66 | 0.11 | |
| Uniform Delay, d1 | 42.6 | 24.3 | | 48.6 | 30.5 | 11.2 | 42.9 | 40.0 | | 36.0 | 31.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.45 | 0.66 | 1.14 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.0 | 2.8 | | 0.8 | 3.5 | 0.1 | 67.6 | 0.6 | | 2.1 | 0.1 | |
| Delay (s) | 47.6 | 27.1 | | 71.4 | 23.6 | 12.9 | 110.5 | 40.6 | | 38.1 | 31.4 | |
| Level of Service | D | C | | E | C | B | F | D | | D | C | |
| Approach Delay (s) | | 29.9 | | | 21.4 | | | 51.6 | | | 36.6 | |
| Approach LOS | | C | | | C | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 31.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.72 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 87.0% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↖ | ↗↖↗ | | ↖↗ | ↖↗ | | | ↖ | ↗↖↗ | ↖ | ↗ | |
| Volume (vph) | 24 | 1298 | 205 | 345 | 806 | 97 | 135 | 25 | 421 | 64 | 22 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | | 1.00 | 0.99 | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 0.97 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4477 | | 3143 | 3251 | | | 1758 | 2805 | 1562 | 1450 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.72 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4477 | | 3143 | 3251 | | | 1326 | 2805 | 1562 | 1450 | |
| 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) | 26 | 1411 | 223 | 375 | 876 | 105 | 147 | 27 | 458 | 70 | 24 | 27 |
| RTOR Reduction (vph) | 0 | 18 | 0 | 0 | 7 | 0 | 0 | 0 | 153 | 0 | 25 | 0 |
| Lane Group Flow (vph) | 26 | 1616 | 0 | 375 | 974 | 0 | 0 | 174 | 305 | 70 | 26 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 18 | 21 | | | | | 21 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 5.3 | 48.0 | | 16.1 | 59.3 | | | 17.8 | 33.9 | 9.6 | 9.6 | |
| Effective Green, g (s) | 5.3 | 48.0 | | 16.1 | 59.3 | | | 17.8 | 33.9 | 9.6 | 9.6 | |
| Actuated g/C Ratio | 0.05 | 0.46 | | 0.15 | 0.56 | | | 0.17 | 0.32 | 0.09 | 0.09 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 81 | 2046 | | 481 | 1836 | | | 224 | 905 | 142 | 132 | |
| v/s Ratio Prot | 0.02 | c0.36 | | c0.12 | 0.30 | | | | 0.05 | c0.04 | 0.02 | |
| v/s Ratio Perm | | | | | | | | c0.13 | 0.06 | | | |
| v/c Ratio | 0.32 | 0.79 | | 0.78 | 0.53 | | | 0.78 | 0.34 | 0.49 | 0.20 | |
| Uniform Delay, d1 | 48.1 | 24.2 | | 42.7 | 14.2 | | | 41.7 | 27.0 | 45.4 | 44.1 | |
| Progression Factor | 0.98 | 1.19 | | 1.17 | 0.98 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.7 | 2.5 | | 5.7 | 0.9 | | | 14.2 | 0.1 | 1.0 | 0.3 | |
| Delay (s) | 47.8 | 31.4 | | 55.7 | 14.8 | | | 55.9 | 27.1 | 46.4 | 44.4 | |
| Level of Service | D | C | | E | B | | | E | C | D | D | |
| Approach Delay (s) | | 31.7 | | | 26.1 | | | 35.0 | | | 45.5 | |
| Approach LOS | | C | | | C | | | D | | | D | |













Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 30.7 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.75 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 70.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: I-880 SB ramps & Davis St/Davis Street

Baseline PM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|-----|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ | |
| Volume (vph) | 0 | 1167 | 627 | 0 | 885 | 412 | 0 | 0 | 0 | 349 | 0 | 390 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.97 | | 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 | 0.85 | | 0.95 | | | | | 1.00 | 0.91 | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 | |
| Satd. Flow (prot) | | 3292 | 1433 | | 3084 | | | | | 1681 | 1479 | 1461 | |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 | |
| Satd. Flow (perm) | | 3292 | 1433 | | 3084 | | | | | 1681 | 1479 | 1461 | |
| 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 | 1268 | 682 | 0 | 962 | 448 | 0 | 0 | 0 | 379 | 0 | 424 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 54 | 54 | |
| Lane Group Flow (vph) | 0 | 1268 | 682 | 0 | 1370 | 0 | 0 | 0 | 0 | 280 | 215 | 200 | |
| Confl. Peds. (#/hr) | | | 13 | | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% | |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot | |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 | |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | | |
| Actuated Green, G (s) | | 64.2 | 105.0 | | 64.2 | | | | | 32.8 | 32.8 | 32.8 | |
| Effective Green, g (s) | | 64.2 | 105.0 | | 64.2 | | | | | 32.8 | 32.8 | 32.8 | |
| Actuated g/C Ratio | | 0.61 | 1.00 | | 0.61 | | | | | 0.31 | 0.31 | 0.31 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 2012 | 1433 | | 1885 | | | | | 525 | 462 | 456 | |
| v/s Ratio Prot | | 0.39 | | | 0.44 | | | | | 0.17 | 0.15 | 0.14 | |
| v/s Ratio Perm | | | 0.48 | | | | | | | | | | |
| v/c Ratio | | 0.63 | 0.48 | | 0.73 | | | | | 0.53 | 0.47 | 0.44 | |
| Uniform Delay, d1 | | 12.9 | 0.0 | | 14.3 | | | | | 29.8 | 29.1 | 28.8 | |
| Progression Factor | | 0.62 | 1.00 | | 0.66 | | | | | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.1 | 0.2 | | 2.3 | | | | | 1.0 | 0.7 | 0.7 | |
| Delay (s) | | 9.1 | 0.2 | | 11.7 | | | | | 30.8 | 29.8 | 29.5 | |
| Level of Service | | A | A | | B | | | | | C | C | C | |
| Approach Delay (s) | | 6.0 | | | 11.7 | | | 0.0 | | | 30.0 | | |
| Approach LOS | | A | | | B | | | A | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 12.6 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.66 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | | | | | | | | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | | | 60.4% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

Baseline PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|-------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↑↑↑ | ↑ |
| Volume (vph) | 1077 | 442 | 0 | 881 | 407 | 541 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Fr _t | 0.96 | | | 1.00 | 0.94 | 0.85 |
| Fl _t Protected | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3385 | | | 3539 | 3309 | 1441 |
| Fl _t Permitted | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3385 | | | 3539 | 3309 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1171 | 480 | 0 | 958 | 442 | 588 |
| RTOR Reduction (vph) | 30 | 0 | 0 | 0 | 43 | 43 |
| Lane Group Flow (vph) | 1621 | 0 | 0 | 958 | 658 | 286 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 70.8 | | | 70.8 | 27.2 | 27.2 |
| Effective Green, g (s) | 70.8 | | | 70.8 | 27.2 | 27.2 |
| Actuated g/C Ratio | 0.67 | | | 0.67 | 0.26 | 0.26 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2282 | | | 2386 | 857 | 373 |
| v/s Ratio Prot | c0.48 | | | 0.27 | c0.20 | 0.20 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.71 | | | 0.40 | 0.77 | 0.77 |
| Uniform Delay, d ₁ | 10.7 | | | 7.6 | 36.0 | 36.0 |
| Progression Factor | 0.49 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d ₂ | 1.6 | | | 0.5 | 3.8 | 8.2 |
| Delay (s) | 6.9 | | | 8.1 | 39.7 | 44.2 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 6.9 | | | 8.1 | 41.2 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 16.9 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.73 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 72.9% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

6: Doolittle Dr & Williams St

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|---------------------------|------|------|------|------|-------|-------|------|--|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↔ | | ↕ | ↕↔ | | |
| Volume (vph) | 52 | 82 | 22 | 98 | 72 | 83 | 16 | 403 | 67 | 166 | 841 | 52 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.99 | | |
| Flt Protected | | 0.98 | | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1530 | | | 1682 | 1306 | 1620 | 3012 | | 1562 | 3045 | | |
| Flt Permitted | | 0.84 | | | 0.74 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1309 | | | 1274 | 1306 | 1620 | 3012 | | 1562 | 3045 | | |
| 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) | 57 | 89 | 24 | 107 | 78 | 90 | 17 | 438 | 73 | 180 | 914 | 57 | |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 67 | 0 | 17 | 0 | 0 | 5 | 0 | |
| Lane Group Flow (vph) | 0 | 163 | 0 | 0 | 185 | 23 | 17 | 494 | 0 | 180 | 966 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 12 | | | | | 6 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 15.8 | | | 15.8 | 15.8 | 1.3 | 21.8 | | 10.7 | 30.7 | | |
| Effective Green, g (s) | | 15.8 | | | 15.8 | 15.8 | 1.3 | 21.8 | | 10.7 | 30.7 | | |
| Actuated g/C Ratio | | 0.26 | | | 0.26 | 0.26 | 0.02 | 0.35 | | 0.17 | 0.50 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 336 | | | 327 | 335 | 34 | 1067 | | 271 | 1520 | | |
| v/s Ratio Prot | | | | | | | 0.01 | 0.16 | | c0.12 | c0.32 | | |
| v/s Ratio Perm | | 0.12 | | | c0.15 | 0.02 | | | | | | | |
| v/c Ratio | | 0.49 | | | 0.57 | 0.07 | 0.50 | 0.46 | | 0.66 | 0.64 | | |
| Uniform Delay, d1 | | 19.4 | | | 19.9 | 17.3 | 29.8 | 15.3 | | 23.7 | 11.3 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 1.5 | | | 2.7 | 0.1 | 14.9 | 0.4 | | 6.6 | 1.0 | | |
| Delay (s) | | 20.9 | | | 22.6 | 17.4 | 44.7 | 15.8 | | 30.3 | 12.3 | | |
| Level of Service | | C | | | C | B | D | B | | C | B | | |
| Approach Delay (s) | | 20.9 | | | 20.9 | | | 16.7 | | | 15.1 | | |
| Approach LOS | | C | | | C | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 16.7 | | HCM 2000 Level of Service | | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.66 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 61.5 | | Sum of lost time (s) | | | | | 13.7 | | | |
| Intersection Capacity Utilization | | | 56.8% | | ICU Level of Service | | | | | B | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

Baseline PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 48 | 412 | 227 | 245 | 252 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.96 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1565 | 1562 | 1345 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1565 | 1562 | 1345 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 52 | 448 | 247 | 266 | 274 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 107 | 0 | 35 |
| Lane Group Flow (vph) | 52 | 448 | 247 | 159 | 274 | 22 |
| Confl. Peds. (#/hr) | | | | 12 | | 6 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 7.1 | 76.9 | 65.8 | 65.8 | 24.5 | 24.5 |
| Effective Green, g (s) | 7.1 | 76.9 | 65.8 | 65.8 | 24.5 | 24.5 |
| Actuated g/C Ratio | 0.06 | 0.70 | 0.60 | 0.60 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 104 | 1277 | 1019 | 936 | 347 | 299 |
| v/s Ratio Prot | c0.03 | c0.25 | 0.14 | | c0.18 | |
| v/s Ratio Perm | | | | 0.10 | | 0.02 |
| v/c Ratio | 0.50 | 0.35 | 0.24 | 0.17 | 0.79 | 0.07 |
| Uniform Delay, d1 | 49.7 | 6.6 | 10.4 | 9.9 | 40.3 | 33.8 |
| Progression Factor | 1.00 | 1.00 | 1.42 | 3.41 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.4 | 0.8 | 0.5 | 0.4 | 11.3 | 0.1 |
| Delay (s) | 51.1 | 7.4 | 15.3 | 34.1 | 51.7 | 33.9 |
| Level of Service | D | A | B | C | D | C |
| Approach Delay (s) | | 11.9 | 25.1 | | 48.6 | |
| Approach LOS | | B | C | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 26.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.48 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 46.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

Baseline PM

8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBL | EBT | EBR | WBL | WBT | NBL2 | NBL | NBR | SBL | SBT | SEL | SER |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|
| Lane Configurations | | ↑ | ↗ | ↖ | ↗ | | ↘ | ↖ | | ↕ | ↗ | ↖ |
| Volume (vph) | 2 | 279 | 381 | 130 | 208 | 201 | 8 | 150 | 1 | 8 | 1 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 9 | 10 | 11 | 11 | 16 | 12 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.97 | | 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 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.85 | | 1.00 | 0.88 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | 1759 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | 1757 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| 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) | 2 | 303 | 414 | 141 | 226 | 218 | 9 | 163 | 1 | 9 | 1 | 9 |
| RTOR Reduction (vph) | 0 | 0 | 219 | 0 | 0 | 0 | 0 | 122 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 305 | 195 | 141 | 226 | 0 | 227 | 41 | 0 | 10 | 10 | 0 |
| Confl. Peds. (#/hr) | | | 14 | | | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | 7 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Turn Type | Perm | NA | Perm | Prot | NA | Prot | Prot | Perm | Split | NA | Prot | |
| Protected Phases | | 2 | | 1 | 6 | 4 | 4 | | 8 | 8 | 7 | |
| Permitted Phases | 2 | | 2 | | | | 4 | | | | | |
| Actuated Green, G (s) | | 51.7 | 51.7 | 14.9 | 70.6 | | 19.0 | 19.0 | | 1.4 | 2.4 | |
| Effective Green, g (s) | | 51.7 | 51.7 | 14.9 | 70.6 | | 19.0 | 19.0 | | 1.4 | 2.4 | |
| Actuated g/C Ratio | | 0.47 | 0.47 | 0.14 | 0.64 | | 0.17 | 0.17 | | 0.01 | 0.02 | |
| Clearance Time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 825 | 677 | 211 | 1094 | | 289 | 295 | | 23 | 34 | |
| v/s Ratio Prot | | | | c0.09 | 0.13 | | c0.14 | | | c0.01 | c0.01 | |
| v/s Ratio Perm | | c0.17 | 0.13 | | | | 0.02 | | | | | |
| v/c Ratio | | 0.37 | 0.29 | 0.67 | 0.21 | | 0.79 | 0.14 | | 0.43 | 0.29 | |
| Uniform Delay, d1 | | 18.7 | 17.9 | 45.2 | 8.1 | | 43.5 | 38.6 | | 53.9 | 53.0 | |
| Progression Factor | | 0.82 | 1.17 | 1.00 | 1.00 | | 0.93 | 0.82 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.1 | 1.0 | 7.8 | 0.4 | | 12.9 | 0.2 | | 12.6 | 4.8 | |
| Delay (s) | | 16.6 | 21.8 | 53.0 | 8.6 | | 53.2 | 31.9 | | 66.5 | 57.7 | |
| Level of Service | | B | C | D | A | | D | C | | E | E | |
| Approach Delay (s) | | 19.6 | | | 25.6 | | | | | 66.5 | 57.7 | |
| Approach LOS | | B | | | C | | | | | E | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 28.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.51 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 20.6 |
| Intersection Capacity Utilization | 76.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

Baseline PM



















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | ↑ | ↗ | ↘ | |
| Volume (veh/h) | 0 | 162 | 243 | 13 | 17 | 4 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 176 | 264 | 14 | 18 | 4 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 278 | | | | 440 | 264 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 278 | | | | 440 | 264 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 97 | 99 |
| cM capacity (veh/h) | 1284 | | | | 574 | 775 |

| Direction, Lane # | EB 1 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|
| Volume Total | 176 | 264 | 14 | 23 |
| Volume Left | 0 | 0 | 0 | 18 |
| Volume Right | 0 | 0 | 14 | 4 |
| cSH | 1700 | 1700 | 1700 | 604 |
| Volume to Capacity | 0.10 | 0.16 | 0.01 | 0.04 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 3 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 11.2 |
| Lane LOS | | | | B |
| Approach Delay (s) | 0.0 | 0.0 | | 11.2 |
| Approach LOS | | | | B |

| Intersection Summary | | | |
|-----------------------------------|--|-------|----------------------|
| Average Delay | | 0.5 | |
| Intersection Capacity Utilization | | 22.8% | ICU Level of Service |
| Analysis Period (min) | | 15 | A |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

Baseline PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 29 | 155 | 12 | 45 | 202 | 48 | 14 | 42 | 29 | 26 | 38 | 20 |
| 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 |
| Hourly flow rate (vph) | 32 | 168 | 13 | 49 | 220 | 52 | 15 | 46 | 32 | 28 | 41 | 22 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 213 | 321 | 92 | 91 | | | | | | | | |
| Volume Left (vph) | 32 | 49 | 15 | 28 | | | | | | | | |
| Volume Right (vph) | 13 | 52 | 32 | 22 | | | | | | | | |
| Hadj (s) | 0.03 | -0.03 | -0.14 | -0.05 | | | | | | | | |
| Departure Headway (s) | 4.8 | 4.6 | 5.2 | 5.3 | | | | | | | | |
| Degree Utilization, x | 0.29 | 0.41 | 0.13 | 0.13 | | | | | | | | |
| Capacity (veh/h) | 702 | 742 | 609 | 607 | | | | | | | | |
| Control Delay (s) | 9.7 | 10.9 | 9.0 | 9.1 | | | | | | | | |
| Approach Delay (s) | 9.7 | 10.9 | 9.0 | 9.1 | | | | | | | | |
| Approach LOS | A | B | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.1 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 36.5% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

Baseline PM























| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 41 | 170 | 30 | 222 | 238 | 182 | 16 | 272 | 172 | 283 | 686 | 90 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | 0.98 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1652 | 1739 | 1447 | 1620 | 1739 | 1401 | 1652 | 3240 | 1351 | 1620 | 3020 | 3020 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1652 | 1739 | 1447 | 1620 | 1739 | 1401 | 1652 | 3240 | 1351 | 1620 | 3020 | 3020 |
| 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) | 45 | 185 | 33 | 241 | 259 | 198 | 17 | 296 | 187 | 308 | 746 | 98 |
| RTOR Reduction (vph) | 0 | 0 | 27 | 0 | 0 | 136 | 0 | 0 | 150 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 45 | 185 | 6 | 241 | 259 | 62 | 17 | 296 | 37 | 308 | 838 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 12 | | | | | 6 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 7.7 | 19.1 | 19.1 | 21.3 | 32.7 | 32.7 | 3.0 | 20.6 | 20.6 | 25.8 | 43.4 | |
| Effective Green, g (s) | 7.7 | 19.1 | 19.1 | 21.3 | 32.7 | 32.7 | 3.0 | 20.6 | 20.6 | 25.8 | 43.4 | |
| Actuated g/C Ratio | 0.07 | 0.18 | 0.18 | 0.20 | 0.31 | 0.31 | 0.03 | 0.20 | 0.20 | 0.25 | 0.41 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 121 | 316 | 263 | 329 | 542 | 437 | 47 | 636 | 265 | 398 | 1250 | |
| v/s Ratio Prot | 0.03 | c0.11 | | c0.15 | 0.15 | | 0.01 | 0.09 | | c0.19 | c0.28 | |
| v/s Ratio Perm | | | 0.00 | | | 0.04 | | | 0.03 | | | |
| v/c Ratio | 0.37 | 0.59 | 0.02 | 0.73 | 0.48 | 0.14 | 0.36 | 0.47 | 0.14 | 0.77 | 0.67 | |
| Uniform Delay, d1 | 46.2 | 39.2 | 35.2 | 39.1 | 29.1 | 25.9 | 50.0 | 37.2 | 34.8 | 36.8 | 24.9 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.6 | 3.3 | 0.0 | 8.7 | 0.9 | 0.2 | 6.4 | 0.7 | 0.3 | 9.6 | 1.6 | |
| Delay (s) | 48.9 | 42.5 | 35.2 | 47.8 | 30.1 | 26.1 | 56.3 | 38.0 | 35.1 | 46.4 | 26.5 | |
| Level of Service | D | D | D | D | C | C | E | D | D | D | C | |
| Approach Delay (s) | | 42.7 | | | 35.1 | | | 37.5 | | | 31.8 | |
| Approach LOS | | D | | | D | | | D | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 34.9 | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.72 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 104.8 | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 62.2% | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

12: Merced St & Marina Blvd

Baseline PM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  | |  |  |  |  |  |  | |
| Volume (vph) | 52 | 694 | 71 | 542 | 577 | 134 | 108 | 207 | 986 | 323 | 218 | 38 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4580 | | 3255 | 3139 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1462 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4580 | | 3255 | 3139 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1462 | |
| 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) | 57 | 754 | 77 | 589 | 627 | 146 | 117 | 225 | 1072 | 351 | 237 | 41 | |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | |
| Lane Group Flow (vph) | 57 | 820 | 0 | 589 | 755 | 0 | 117 | 225 | 1072 | 351 | 237 | 9 | |
| Confl. Peds. (#/hr) | | | 8 | | | 2 | | | | | | 7 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 9.1 | 24.0 | | 27.0 | 41.9 | | 17.0 | 25.0 | 52.0 | 15.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 9.1 | 25.5 | | 27.0 | 43.4 | | 17.0 | 26.5 | 52.0 | 15.0 | 24.5 | 24.5 | |
| Actuated g/C Ratio | 0.08 | 0.23 | | 0.25 | 0.39 | | 0.15 | 0.24 | 0.47 | 0.14 | 0.22 | 0.22 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 129 | 1061 | | 798 | 1238 | | 259 | 808 | 1279 | 443 | 721 | 325 | |
| v/s Ratio Prot | 0.04 | c0.18 | | 0.18 | 0.24 | | 0.07 | 0.07 | c0.40 | c0.11 | 0.07 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 | |
| v/c Ratio | 0.44 | 0.77 | | 0.74 | 0.61 | | 0.45 | 0.28 | 0.84 | 0.79 | 0.33 | 0.03 | |
| Uniform Delay, d1 | 48.0 | 39.5 | | 38.2 | 26.5 | | 42.3 | 34.0 | 25.3 | 46.0 | 35.9 | 33.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.02 | 1.01 | 0.93 | 0.99 | 0.99 | 1.00 | |
| Incremental Delay, d2 | 3.3 | 5.5 | | 6.0 | 2.2 | | 5.4 | 0.2 | 5.0 | 13.3 | 0.4 | 0.0 | |
| Delay (s) | 51.3 | 45.0 | | 44.3 | 28.8 | | 48.5 | 34.6 | 28.6 | 58.6 | 36.0 | 33.5 | |
| Level of Service | D | D | | D | C | | D | C | C | E | D | C | |
| Approach Delay (s) | | 45.4 | | | 35.5 | | | 31.2 | | | 48.5 | | |
| Approach LOS | | D | | | D | | | C | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 38.0 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.81 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | | | 71.4% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Baseline PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↵ | ↑↑ | | ↵ |
| Volume (veh/h) | 2003 | 0 | 0 | 1162 | 0 | 20 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 2177 | 0 | 0 | 1263 | 0 | 22 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | 450 | | |
| pX, platoon unblocked | | | | 0.90 | 0.94 | 0.90 |
| vC, conflicting volume | | | | 2177 | 2809 | 544 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | | 1771 | 2116 | 0 |
| tC, single (s) | | | | 4.1 | 6.8 | 6.9 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | | 2.2 | 3.5 | 3.3 |
| p0 queue free % | | | | 100 | 100 | 98 |
| cM capacity (veh/h) | | | | 314 | 41 | 980 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total | 622 | 622 | 622 | 311 | 0 | 632 | 632 | 22 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 980 |
| Volume to Capacity | 0.37 | 0.37 | 0.37 | 0.18 | 0.00 | 0.37 | 0.37 | 0.02 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.8 |
| Lane LOS | | | | | | | | A |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | 8.8 |
| Approach LOS | | | | | | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|--|------------------------|
| Average Delay | | | 0.1 |
| Intersection Capacity Utilization | 39.0% | | ICU Level of Service A |
| Analysis Period (min) | 15 | | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|-------|------|------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1160 | 892 | 408 | 697 | 0 | 0 | 0 | 445 | 0 | 0 | 465 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1261 | 970 | 443 | 758 | 0 | 0 | 0 | 484 | 0 | 0 | 505 | |
| RTOR Reduction (vph) | 0 | 0 | 542 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 364 | |
| Lane Group Flow (vph) | 0 | 1261 | 428 | 443 | 758 | 0 | 0 | 0 | 484 | 0 | 0 | 141 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 34.0 | 34.0 | 13.1 | 54.1 | | | | 16.4 | | | 16.4 | |
| Effective Green, g (s) | | 34.0 | 34.0 | 13.1 | 54.1 | | | | 16.4 | | | 16.4 | |
| Actuated g/C Ratio | | 0.44 | 0.44 | 0.17 | 0.70 | | | | 0.21 | | | 0.21 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 1481 | 1166 | 534 | 2357 | | | | | 620 | | | 593 | |
| v/s Ratio Prot | | c0.38 | | c0.14 | 0.23 | | | | c0.17 | | | 0.05 | |
| v/s Ratio Perm | | | 0.16 | | | | | | | | | | |
| v/c Ratio | | 0.85 | 0.37 | 0.83 | 0.32 | | | | 0.78 | | | 0.24 | |
| Uniform Delay, d1 | | 19.2 | 14.3 | 30.9 | 4.4 | | | | 28.6 | | | 25.1 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 4.9 | 0.2 | 10.3 | 0.1 | | | | 6.3 | | | 0.2 | |
| Delay (s) | | 24.2 | 14.5 | 41.2 | 4.5 | | | | 34.9 | | | 25.3 | |
| Level of Service | | C | B | D | A | | | | C | | | C | |
| Approach Delay (s) | | 20.0 | | | 18.0 | | | 34.9 | | | 25.3 | | |
| Approach LOS | | B | | | B | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.7 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.83 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 77.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 55.1% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

Baseline PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↵ | ↑↑↑ | ↑↑ | ↵ | | |
| Volume (vph) | 717 | 0 | 678 | 502 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 779 | 0 | 737 | 546 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 102 | 0 | 0 |
| Lane Group Flow (vph) | 779 | 0 | 737 | 444 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 36.0 | | 23.9 | 23.9 | | |
| Effective Green, g (s) | 36.0 | | 23.9 | 23.9 | | |
| Actuated g/C Ratio | 0.52 | | 0.35 | 0.35 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 846 | | 1163 | 531 | | |
| v/s Ratio Prot | c0.48 | | 0.22 | | | |
| v/s Ratio Perm | | | | c0.29 | | |
| v/c Ratio | 0.92 | | 0.63 | 0.84 | | |
| Uniform Delay, d1 | 15.1 | | 18.8 | 20.7 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 15.1 | | 1.1 | 11.0 | | |
| Delay (s) | 30.3 | | 20.0 | 31.7 | | |
| Level of Service | C | | B | C | | |
| Approach Delay (s) | | 30.3 | 25.0 | | 0.0 | |
| Approach LOS | | C | C | | A | |

| Intersection Summary | | | |
|-----------------------------------|--|-------|-----------------------------|
| HCM 2000 Control Delay | | 27.0 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | | 0.89 | |
| Actuated Cycle Length (s) | | 68.9 | Sum of lost time (s) 9.0 |
| Intersection Capacity Utilization | | 78.3% | ICU Level of Service D |
| Analysis Period (min) | | 15 | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

Baseline PM


























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | ↘ | ↑↑↑ | ↗ | ↘ | ↑↑↑ | | ↘ | ↗ | ↗ | | ↗ | ↗ |
| Volume (vph) | 178 | 892 | 354 | 151 | 655 | 19 | 365 | 32 | 101 | 15 | 50 | 57 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1529 | 1678 | 4632 | | 1539 | 1555 | 1508 | | 1746 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1529 | 1678 | 4632 | | 1539 | 1555 | 1508 | | 1746 | 1489 |
| 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) | 193 | 970 | 385 | 164 | 712 | 21 | 397 | 35 | 110 | 16 | 54 | 62 |
| RTOR Reduction (vph) | 0 | 0 | 243 | 0 | 3 | 0 | 0 | 0 | 87 | 0 | 0 | 57 |
| Lane Group Flow (vph) | 193 | 970 | 142 | 164 | 730 | 0 | 214 | 218 | 23 | 0 | 70 | 5 |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 17.1 | 37.0 | 37.0 | 14.7 | 34.6 | | 21.1 | 21.1 | 21.1 | | 8.0 | 8.0 |
| Effective Green, g (s) | 17.1 | 37.0 | 37.0 | 14.7 | 34.6 | | 21.1 | 21.1 | 21.1 | | 8.0 | 8.0 |
| Actuated g/C Ratio | 0.17 | 0.37 | 0.37 | 0.15 | 0.35 | | 0.21 | 0.21 | 0.21 | | 0.08 | 0.08 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 277 | 1722 | 565 | 246 | 1602 | | 324 | 328 | 318 | | 139 | 119 |
| v/s Ratio Prot | c0.12 | c0.21 | | 0.10 | 0.16 | | 0.14 | c0.14 | | | c0.04 | 0.00 |
| v/s Ratio Perm | | | 0.09 | | | | | | 0.02 | | | |
| v/c Ratio | 0.70 | 0.56 | 0.25 | 0.67 | 0.46 | | 0.66 | 0.66 | 0.07 | | 0.50 | 0.04 |
| Uniform Delay, d1 | 39.0 | 25.1 | 21.9 | 40.3 | 25.4 | | 36.2 | 36.2 | 31.6 | | 44.1 | 42.5 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.84 | 1.22 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 8.0 | 1.3 | 1.1 | 7.1 | 0.9 | | 5.5 | 5.5 | 0.1 | | 3.9 | 0.2 |
| Delay (s) | 47.0 | 26.4 | 23.0 | 41.1 | 31.9 | | 41.6 | 41.7 | 31.7 | | 48.0 | 42.7 |
| Level of Service | D | C | C | D | C | | D | D | C | | D | D |
| Approach Delay (s) | | 28.1 | | | 33.6 | | | 39.7 | | | 45.5 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 32.4 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.63 | C |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 59.6% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | B |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd
























Baseline PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  | |  |  |  |  |  |  |
| Volume (vph) | 62 | 755 | 94 | 128 | 477 | 19 | 154 | 126 | 317 | 30 | 115 | 74 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1463 | 1652 | 3268 | | 3143 | 1705 | 1658 | 3204 | 3020 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1463 | 1652 | 3268 | | 3143 | 1705 | 1658 | 3204 | 3020 | |
| 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) | 67 | 821 | 102 | 139 | 518 | 21 | 167 | 137 | 345 | 33 | 125 | 80 |
| RTOR Reduction (vph) | 0 | 0 | 57 | 0 | 2 | 0 | 0 | 0 | 277 | 0 | 69 | 0 |
| Lane Group Flow (vph) | 67 | 821 | 45 | 139 | 537 | 0 | 167 | 137 | 68 | 33 | 136 | 0 |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 7.6 | 43.7 | 43.7 | 13.8 | 49.9 | | 11.4 | 19.7 | 19.7 | 4.8 | 13.5 | |
| Effective Green, g (s) | 7.6 | 43.7 | 43.7 | 13.8 | 49.9 | | 11.4 | 19.7 | 19.7 | 4.8 | 13.5 | |
| Actuated g/C Ratio | 0.08 | 0.44 | 0.44 | 0.14 | 0.50 | | 0.11 | 0.20 | 0.20 | 0.05 | 0.14 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 123 | 1443 | 639 | 227 | 1630 | | 358 | 335 | 326 | 153 | 407 | |
| v/s Ratio Prot | 0.04 | c0.25 | | c0.08 | 0.16 | | c0.05 | c0.08 | | 0.01 | 0.04 | |
| v/s Ratio Perm | | | 0.03 | | | | | | 0.04 | | | |
| v/c Ratio | 0.54 | 0.57 | 0.07 | 0.61 | 0.33 | | 0.47 | 0.41 | 0.21 | 0.22 | 0.33 | |
| Uniform Delay, d1 | 44.5 | 21.1 | 16.3 | 40.6 | 15.0 | | 41.5 | 35.1 | 33.6 | 45.8 | 39.2 | |
| Progression Factor | 1.45 | 0.20 | 0.00 | 1.18 | 0.79 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.3 | 1.4 | 0.2 | 2.9 | 0.3 | | 1.3 | 1.1 | 0.4 | 1.0 | 0.7 | |
| Delay (s) | 67.0 | 5.6 | 0.2 | 50.6 | 12.1 | | 42.8 | 36.2 | 34.1 | 46.8 | 39.8 | |
| Level of Service | E | A | A | D | B | | D | D | C | D | D | |
| Approach Delay (s) | | 9.2 | | | 20.0 | | | 36.7 | | | 40.8 | |
| Approach LOS | | A | | | C | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 22.0 | HCM 2000 Level of Service | | | | C | | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.55 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | Sum of lost time (s) | | | | 18.0 | | | | |
| Intersection Capacity Utilization | | | 56.5% | ICU Level of Service | | | | B | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: San Leandro Blvd & Marina Blvd

Baseline PM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  | |  |  |  |  |  |  |  |  | |
| Volume (vph) | 313 | 456 | 319 | 3 | 185 | 14 | 220 | 439 | 14 | 51 | 670 | 245 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 | |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1648 | 1739 | 1770 | | 1737 | 1480 | 1652 | 3523 | | 1652 | 3154 | | |
| Flt Permitted | 0.32 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 553 | 1739 | 1770 | | 1725 | 1480 | 1652 | 3523 | | 1652 | 3154 | | |
| 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) | 340 | 496 | 347 | 3 | 201 | 15 | 239 | 477 | 15 | 55 | 728 | 266 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 2 | 0 | 0 | 35 | 0 | |
| Lane Group Flow (vph) | 340 | 496 | 347 | 0 | 204 | 3 | 239 | 490 | 0 | 55 | 959 | 0 | |
| Confl. Peds. (#/hr) | 12 | | | | | | 12 | | | | | 6 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | | |
| Actuated Green, G (s) | 39.9 | 39.9 | 100.0 | | 17.4 | 17.4 | 17.8 | 38.3 | | 7.3 | 27.3 | | |
| Effective Green, g (s) | 39.9 | 39.9 | 100.0 | | 17.4 | 17.4 | 17.8 | 38.3 | | 7.3 | 27.3 | | |
| Actuated g/C Ratio | 0.40 | 0.40 | 1.00 | | 0.17 | 0.17 | 0.18 | 0.38 | | 0.07 | 0.27 | | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | | |
| Lane Grp Cap (vph) | 423 | 693 | 1770 | | 300 | 257 | 294 | 1349 | | 120 | 861 | | |
| v/s Ratio Prot | c0.15 | 0.29 | | | | | c0.14 | 0.14 | | 0.03 | c0.30 | | |
| v/s Ratio Perm | c0.17 | | 0.20 | | 0.12 | 0.00 | | | | | | | |
| v/c Ratio | 0.80 | 0.72 | 0.20 | | 0.68 | 0.01 | 0.81 | 0.36 | | 0.46 | 1.11 | | |
| Uniform Delay, d1 | 23.6 | 25.3 | 0.0 | | 38.7 | 34.2 | 39.5 | 22.1 | | 44.5 | 36.4 | | |
| Progression Factor | 0.71 | 0.76 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 9.2 | 3.3 | 0.2 | | 6.7 | 0.0 | 15.6 | 0.8 | | 2.8 | 66.9 | | |
| Delay (s) | 26.0 | 22.5 | 0.2 | | 45.4 | 34.2 | 55.1 | 22.9 | | 47.2 | 103.3 | | |
| Level of Service | C | C | A | | D | C | E | C | | D | F | | |
| Approach Delay (s) | | 17.0 | | | 44.6 | | | 33.4 | | | 100.3 | | |
| Approach LOS | | B | | | D | | | C | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 50.1 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.94 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 92.2% | | | | | | | | | ICU Level of Service | F |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

Baseline PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 57 | 26 | 37 | 82 | 149 | 54 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 62 | 28 | 40 | 89 | 162 | 59 |

| Direction, Lane # | EB 1 | NB 1 | SB 1 |
|-----------------------|-------|------|-------|
| Volume Total (vph) | 90 | 129 | 221 |
| Volume Left (vph) | 62 | 40 | 0 |
| Volume Right (vph) | 28 | 0 | 59 |
| Hadj (s) | -0.02 | 0.10 | -0.13 |
| Departure Headway (s) | 4.7 | 4.4 | 4.1 |
| Degree Utilization, x | 0.12 | 0.16 | 0.25 |
| Capacity (veh/h) | 715 | 781 | 848 |
| Control Delay (s) | 8.3 | 8.3 | 8.5 |
| Approach Delay (s) | 8.3 | 8.3 | 8.5 |
| Approach LOS | A | A | A |

| Intersection Summary | | | |
|-----------------------------------|-------|-----|------------------------|
| Delay | | 8.4 | |
| Level of Service | | A | |
| Intersection Capacity Utilization | 32.2% | | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

Baseline PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 9 | 4 | 6 | 109 | 108 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 10 | 4 | 7 | 118 | 117 | 21 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 14 | 125 | 138 | | | |
| Volume Left (vph) | 10 | 7 | 0 | | | |
| Volume Right (vph) | 4 | 0 | 21 | | | |
| Hadj (s) | -0.01 | 0.04 | -0.06 | | | |
| Departure Headway (s) | 4.4 | 4.1 | 4.0 | | | |
| Degree Utilization, x | 0.02 | 0.14 | 0.15 | | | |
| Capacity (veh/h) | 761 | 859 | 889 | | | |
| Control Delay (s) | 7.5 | 7.8 | 7.7 | | | |
| Approach Delay (s) | 7.5 | 7.8 | 7.7 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.7 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 20.6% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Signalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive

Baseline PM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Volume (vph) | 46 | 56 | 63 | 64 | 40 | 71 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Util. Factor | 1.00 | | 1.00 | | | 1.00 |
| Frt | 0.93 | | 0.93 | | | 1.00 |
| Flt Protected | 0.98 | | 1.00 | | | 0.98 |
| Satd. Flow (prot) | 1687 | | 1735 | | | 1830 |
| Flt Permitted | 0.98 | | 1.00 | | | 0.88 |
| Satd. Flow (perm) | 1687 | | 1735 | | | 1637 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 50 | 61 | 68 | 70 | 43 | 77 |
| RTOR Reduction (vph) | 37 | 0 | 42 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 74 | 0 | 96 | 0 | 0 | 120 |
| Turn Type | Prot | | NA | | Perm | NA |
| Protected Phases | 8 | | 2 | | | 6 |
| Permitted Phases | | | | | 6 | |
| Actuated Green, G (s) | 18.0 | | 18.0 | | | 18.0 |
| Effective Green, g (s) | 18.0 | | 18.0 | | | 18.0 |
| Actuated g/C Ratio | 0.40 | | 0.40 | | | 0.40 |
| Clearance Time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Grp Cap (vph) | 674 | | 694 | | | 654 |
| v/s Ratio Prot | c0.04 | | 0.06 | | | |
| v/s Ratio Perm | | | | | | c0.07 |
| v/c Ratio | 0.11 | | 0.14 | | | 0.18 |
| Uniform Delay, d1 | 8.5 | | 8.6 | | | 8.7 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.3 | | 0.4 | | | 0.6 |
| Delay (s) | 8.8 | | 9.0 | | | 9.4 |
| Level of Service | A | | A | | | A |
| Approach Delay (s) | 8.8 | | 9.0 | | | 9.4 |
| Approach LOS | A | | A | | | A |


















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 9.1 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.15 | | |
| Actuated Cycle Length (s) | 45.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 30.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Baseline PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 8 | 109 | 12 | 31 | 137 | 39 | 10 | 21 | 22 | 35 | 24 | 23 |
| 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 |
| Hourly flow rate (vph) | 9 | 118 | 13 | 34 | 149 | 42 | 11 | 23 | 24 | 38 | 26 | 25 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 9 | 132 | 225 | 58 | 89 | | | | | | | |
| Volume Left (vph) | 9 | 0 | 34 | 11 | 38 | | | | | | | |
| Volume Right (vph) | 0 | 13 | 42 | 24 | 25 | | | | | | | |
| Hadj (s) | 0.53 | -0.04 | -0.05 | -0.18 | -0.05 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.0 | 4.5 | 4.7 | 4.8 | | | | | | | |
| Degree Utilization, x | 0.01 | 0.18 | 0.28 | 0.08 | 0.12 | | | | | | | |
| Capacity (veh/h) | 621 | 686 | 767 | 699 | 690 | | | | | | | |
| Control Delay (s) | 7.5 | 7.9 | 9.2 | 8.1 | 8.4 | | | | | | | |
| Approach Delay (s) | 7.9 | | 9.2 | 8.1 | 8.4 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.6 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 36.9% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 39 | 102 | 61 | 61 | 95 | 121 | 44 | 287 | 42 | 186 | 588 | 70 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.98 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1712 | 1258 | 1620 | 1739 | 1318 | 1711 | 3018 | | 1620 | 3026 | |
| Flt Permitted | | 0.89 | 1.00 | 0.66 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1537 | 1258 | 1125 | 1739 | 1318 | 1711 | 3018 | | 1620 | 3026 | |
| 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) | 42 | 111 | 66 | 66 | 103 | 132 | 48 | 312 | 46 | 202 | 639 | 76 |
| RTOR Reduction (vph) | 0 | 0 | 52 | 0 | 0 | 103 | 0 | 15 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 0 | 153 | 14 | 66 | 103 | 29 | 48 | 343 | 0 | 202 | 705 | 0 |
| Confl. Peds. (#/hr) | 12 | | | | | | 12 | | | | | 6 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 | 2.9 | 18.4 | | 9.8 | 25.3 | |
| Effective Green, g (s) | | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 | 2.9 | 18.4 | | 9.8 | 25.3 | |
| Actuated g/C Ratio | | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.05 | 0.33 | | 0.18 | 0.46 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 336 | 275 | 246 | 380 | 288 | 89 | 1004 | | 287 | 1384 | |
| v/s Ratio Prot | | | | | 0.06 | | 0.03 | 0.11 | | c0.12 | c0.23 | |
| v/s Ratio Perm | | c0.10 | 0.01 | 0.06 | | 0.02 | | | | | | |
| v/c Ratio | | 0.46 | 0.05 | 0.27 | 0.27 | 0.10 | 0.54 | 0.34 | | 0.70 | 0.51 | |
| Uniform Delay, d1 | | 18.7 | 17.1 | 17.9 | 17.9 | 17.3 | 25.5 | 13.9 | | 21.4 | 10.6 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.0 | 0.1 | 0.6 | 0.4 | 0.2 | 6.2 | 0.3 | | 7.6 | 0.4 | |
| Delay (s) | | 19.7 | 17.1 | 18.5 | 18.3 | 17.4 | 31.7 | 14.2 | | 29.0 | 11.0 | |
| Level of Service | | B | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 18.9 | | | 18.0 | | | 16.2 | | | 15.0 | |
| Approach LOS | | B | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.57 | | |
| Actuated Cycle Length (s) | 55.3 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 48.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|-------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 158 | 194 | 103 | 147 | 148 | 44 | 66 | 394 | 88 | 62 | 556 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1593 | 1863 | 1310 | 1593 | 1863 | 1372 | 1652 | 3145 | | 1593 | 3144 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1593 | 1863 | 1310 | 1593 | 1863 | 1372 | 1652 | 3145 | | 1593 | 3144 | |
| 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) | 172 | 211 | 112 | 160 | 161 | 48 | 72 | 428 | 96 | 67 | 604 | 89 |
| RTOR Reduction (vph) | 0 | 0 | 89 | 0 | 0 | 37 | 0 | 17 | 0 | 0 | 11 | 0 |
| Lane Group Flow (vph) | 172 | 211 | 23 | 160 | 161 | 11 | 72 | 507 | 0 | 67 | 682 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | 3 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 17.3 | 22.7 | 22.7 | 19.6 | 25.0 | 25.0 | 7.5 | 39.5 | | 9.2 | 41.2 | |
| Effective Green, g (s) | 17.3 | 22.7 | 22.7 | 19.6 | 25.0 | 25.0 | 7.5 | 39.5 | | 9.2 | 41.2 | |
| Actuated g/C Ratio | 0.16 | 0.21 | 0.21 | 0.18 | 0.23 | 0.23 | 0.07 | 0.36 | | 0.08 | 0.37 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 250 | 384 | 270 | 283 | 423 | 311 | 112 | 1129 | | 133 | 1177 | |
| v/s Ratio Prot | c0.11 | c0.11 | | c0.10 | 0.09 | | c0.04 | 0.16 | | 0.04 | c0.22 | |
| v/s Ratio Perm | | | 0.02 | | | 0.01 | | | | | | |
| v/c Ratio | 0.69 | 0.55 | 0.09 | 0.57 | 0.38 | 0.04 | 0.64 | 0.45 | | 0.50 | 0.58 | |
| Uniform Delay, d1 | 43.8 | 39.1 | 35.3 | 41.3 | 36.0 | 33.1 | 49.9 | 26.9 | | 48.2 | 27.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.03 | 1.03 | | 0.82 | 0.73 | |
| Incremental Delay, d2 | 8.3 | 2.0 | 0.2 | 3.1 | 0.8 | 0.1 | 13.1 | 1.3 | | 3.9 | 2.0 | |
| Delay (s) | 52.1 | 41.1 | 35.5 | 44.4 | 36.7 | 33.2 | 64.3 | 28.9 | | 43.3 | 22.1 | |
| Level of Service | D | D | D | D | D | C | E | C | | D | C | |
| Approach Delay (s) | | 43.6 | | | 39.6 | | | 33.2 | | | 24.0 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 33.4 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.59 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 64.9% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|--------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 14 | 279 | 3 | 6 | 346 | 84 | 10 | 0 | 7 | 129 | 0 | 87 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.97 | | | 0.94 | | | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.97 | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 1860 | | | 3435 | | | 1707 | | | 1710 | |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.83 | | | 0.81 | |
| Satd. Flow (perm) | 1770 | 1860 | | | 3266 | | | 1456 | | | 1420 | |
| 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) | 15 | 303 | 3 | 7 | 376 | 91 | 11 | 0 | 8 | 140 | 0 | 95 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 14 | 0 | 0 | 81 | 0 |
| Lane Group Flow (vph) | 15 | 306 | 0 | 0 | 440 | 0 | 0 | 5 | 0 | 0 | 154 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 0.8 | 27.1 | | | 21.4 | | | 12.0 | | | 12.0 | |
| Effective Green, g (s) | 0.8 | 27.1 | | | 21.4 | | | 12.0 | | | 12.0 | |
| Actuated g/C Ratio | 0.02 | 0.56 | | | 0.45 | | | 0.25 | | | 0.25 | |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Grp Cap (vph) | 29 | 1050 | | | 1456 | | | 364 | | | 355 | |
| v/s Ratio Prot | 0.01 | c0.16 | | | | | | | | | | |
| v/s Ratio Perm | | | | | 0.13 | | | 0.00 | | | c0.11 | |
| v/c Ratio | 0.52 | 0.29 | | | 1.49dr | | | 0.01 | | | 0.43 | |
| Uniform Delay, d1 | 23.4 | 5.4 | | | 8.5 | | | 13.5 | | | 15.1 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 6.3 | 0.2 | | | 0.2 | | | 0.0 | | | 1.2 | |
| Delay (s) | 29.7 | 5.7 | | | 8.7 | | | 13.6 | | | 16.3 | |
| Level of Service | C | A | | | A | | | B | | | B | |
| Approach Delay (s) | | 6.8 | | | 8.7 | | | 13.6 | | | 16.3 | |
| Approach LOS | | A | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 9.9 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.38 | | |
| Actuated Cycle Length (s) | 48.0 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 39.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
26: Miller St & Fairway Dr/Aladdin Ave

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 17 | 566 | 13 | 18 | 381 | 84 | 68 | 2 | 56 | 120 | 2 | 83 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1856 | | 1593 | 1933 | | 1711 | 1539 | | 1770 | 1589 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.70 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1856 | | 1593 | 1933 | | 1256 | 1539 | | 1770 | 1589 | |
| 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) | 18 | 615 | 14 | 20 | 414 | 91 | 74 | 2 | 61 | 130 | 2 | 90 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 54 | 0 | 0 | 63 | 0 |
| Lane Group Flow (vph) | 18 | 628 | 0 | 20 | 499 | 0 | 74 | 9 | 0 | 130 | 29 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 2.1 | 37.1 | | 2.3 | 37.3 | | 9.1 | 9.1 | | 10.0 | 23.1 | |
| Effective Green, g (s) | 2.1 | 37.1 | | 2.3 | 37.3 | | 9.1 | 9.1 | | 10.0 | 23.1 | |
| Actuated g/C Ratio | 0.03 | 0.49 | | 0.03 | 0.49 | | 0.12 | 0.12 | | 0.13 | 0.30 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 48 | 902 | | 48 | 944 | | 149 | 183 | | 231 | 481 | |
| v/s Ratio Prot | 0.01 | c0.34 | | c0.01 | 0.26 | | | 0.01 | | c0.07 | 0.02 | |
| v/s Ratio Perm | | | | | | | c0.06 | | | | | |
| v/c Ratio | 0.38 | 0.70 | | 0.42 | 0.53 | | 0.50 | 0.05 | | 0.56 | 0.06 | |
| Uniform Delay, d1 | 36.5 | 15.2 | | 36.3 | 13.4 | | 31.5 | 29.8 | | 31.1 | 18.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.8 | 2.5 | | 2.1 | 0.7 | | 3.5 | 0.2 | | 1.9 | 0.1 | |
| Delay (s) | 38.2 | 17.8 | | 38.5 | 14.1 | | 35.0 | 29.9 | | 33.0 | 19.0 | |
| Level of Service | D | B | | D | B | | C | C | | C | B | |
| Approach Delay (s) | | 18.3 | | | 15.1 | | | 32.7 | | | 27.2 | |
| Approach LOS | | B | | | B | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.63 | | |
| Actuated Cycle Length (s) | 76.3 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 51.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

27: Teagarden St & Aladdin Ave

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 109 | 405 | 116 | 2 | 177 | 64 | 45 | 101 | 11 | 36 | 204 | 188 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.96 | | 1.00 | 0.99 | | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1953 | | 1711 | 1637 | | 1652 | 1831 | | 1643 | 1764 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.29 | 1.00 | | 0.68 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1953 | | 1711 | 1637 | | 512 | 1831 | | 1174 | 1764 | |
| 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) | 118 | 440 | 126 | 2 | 192 | 70 | 49 | 110 | 12 | 39 | 222 | 204 |
| RTOR Reduction (vph) | 0 | 13 | 0 | 0 | 18 | 0 | 0 | 5 | 0 | 0 | 45 | 0 |
| Lane Group Flow (vph) | 118 | 553 | 0 | 2 | 244 | 0 | 49 | 117 | 0 | 39 | 381 | 0 |
| Confl. Peds. (#/hr) | | | | | | 12 | | | 6 | 6 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 8.2 | 25.3 | | 1.0 | 18.1 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Effective Green, g (s) | 8.2 | 25.3 | | 1.0 | 18.1 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Actuated g/C Ratio | 0.14 | 0.44 | | 0.02 | 0.32 | | 0.31 | 0.31 | | 0.31 | 0.31 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 244 | 862 | | 29 | 517 | | 160 | 575 | | 368 | 554 | |
| v/s Ratio Prot | c0.07 | c0.28 | | 0.00 | 0.15 | | | 0.06 | | | c0.22 | |
| v/s Ratio Perm | | | | | | | 0.10 | | | 0.03 | | |
| v/c Ratio | 0.48 | 0.64 | | 0.07 | 0.47 | | 0.31 | 0.20 | | 0.11 | 0.69 | |
| Uniform Delay, d1 | 22.6 | 12.5 | | 27.7 | 15.8 | | 14.9 | 14.4 | | 13.9 | 17.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.1 | 1.8 | | 1.4 | 0.9 | | 1.5 | 0.2 | | 0.2 | 3.8 | |
| Delay (s) | 24.7 | 14.3 | | 29.1 | 16.7 | | 16.4 | 14.6 | | 14.1 | 21.0 | |
| Level of Service | C | B | | C | B | | B | B | | B | C | |
| Approach Delay (s) | | 16.1 | | | 16.8 | | | 15.1 | | | 20.4 | |
| Approach LOS | | B | | | B | | | B | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 17.4 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.67 | | |
| Actuated Cycle Length (s) | 57.3 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 73.5% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 259 | 4 | 233 | 16 | 5 | 12 | 86 | 238 | 1 | 3 | 310 | 95 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.97 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | | 1.00 | 0.89 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1535 | | 1652 | 1516 | | 1652 | 1705 | 1459 | 1711 | 3223 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1535 | | 1652 | 1516 | | 1652 | 1705 | 1459 | 1711 | 3223 | |
| 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) | 282 | 4 | 253 | 17 | 5 | 13 | 93 | 259 | 1 | 3 | 337 | 103 |
| RTOR Reduction (vph) | 0 | 155 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | 0 | 38 | 0 |
| Lane Group Flow (vph) | 282 | 102 | 0 | 17 | 8 | 0 | 93 | 259 | 0 | 3 | 402 | 0 |
| Confl. Peds. (#/hr) | | | | | | 4 | | | 3 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 2 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 15.9 | 28.9 | | 1.4 | 14.4 | | 8.9 | 26.5 | 26.5 | 1.2 | 18.8 | |
| Effective Green, g (s) | 15.9 | 28.9 | | 1.4 | 14.4 | | 8.9 | 26.5 | 26.5 | 1.2 | 18.8 | |
| Actuated g/C Ratio | 0.21 | 0.39 | | 0.02 | 0.19 | | 0.12 | 0.36 | 0.36 | 0.02 | 0.25 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 352 | 595 | | 31 | 293 | | 197 | 606 | 518 | 27 | 813 | |
| v/s Ratio Prot | c0.17 | c0.07 | | 0.01 | 0.00 | | c0.06 | 0.15 | | 0.00 | c0.12 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 0.80 | 0.17 | | 0.55 | 0.03 | | 0.47 | 0.43 | 0.00 | 0.11 | 0.49 | |
| Uniform Delay, d1 | 27.8 | 15.0 | | 36.2 | 24.4 | | 30.6 | 18.2 | 15.5 | 36.1 | 23.8 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 13.9 | 0.3 | | 30.6 | 0.1 | | 3.7 | 1.0 | 0.0 | 3.8 | 1.0 | |
| Delay (s) | 41.7 | 15.2 | | 66.9 | 24.4 | | 34.3 | 19.3 | 15.5 | 39.9 | 24.8 | |
| Level of Service | D | B | | E | C | | C | B | B | D | C | |
| Approach Delay (s) | | 29.1 | | | 45.0 | | | 23.2 | | | 24.9 | |
| Approach LOS | | C | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 26.6 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.50 | | |
| Actuated Cycle Length (s) | 74.5 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 48.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

Baseline PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|------|-------|------|------|------|-------|------|------|
| Lane Configurations | | ↕ | | | ↕ | ↗ | ↖ | ↕↕↕ | | ↖ | ↕↕ | |
| Volume (vph) | 3 | 0 | 0 | 19 | 0 | 73 | 0 | 1237 | 38 | 97 | 743 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.99 | | 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 | 1.00 | |
| Flt Protected | | 0.95 | | | 0.95 | 1.00 | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1765 | | | 1562 | 1399 | | 4928 | | 1619 | 3470 | |
| Flt Permitted | | 0.74 | | | 0.76 | 1.00 | | 1.00 | | 0.18 | 1.00 | |
| Satd. Flow (perm) | | 1381 | | | 1243 | 1399 | | 4928 | | 303 | 3470 | |
| 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) | 3 | 0 | 0 | 21 | 0 | 79 | 0 | 1345 | 41 | 105 | 808 | 2 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 1 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 3 | 0 | 0 | 21 | 33 | 0 | 1385 | 0 | 105 | 810 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 | 5 | | 2 | 2 | | 5 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 9.4 | | | 9.4 | 9.4 | | 92.0 | | 92.0 | 92.0 | |
| Effective Green, g (s) | | 9.4 | | | 9.4 | 9.4 | | 92.0 | | 92.0 | 92.0 | |
| Actuated g/C Ratio | | 0.09 | | | 0.09 | 0.09 | | 0.84 | | 0.84 | 0.84 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 118 | | | 106 | 119 | | 4121 | | 253 | 2902 | |
| v/s Ratio Prot | | | | | | | | 0.28 | | | 0.23 | |
| v/s Ratio Perm | | 0.00 | | | 0.02 | c0.02 | | | | c0.35 | | |
| v/c Ratio | | 0.03 | | | 0.20 | 0.28 | | 0.34 | | 0.42 | 0.28 | |
| Uniform Delay, d1 | | 46.1 | | | 46.8 | 47.1 | | 2.0 | | 2.3 | 1.9 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 0.85 | | 1.10 | 0.47 | |
| Incremental Delay, d2 | | 0.1 | | | 0.9 | 1.3 | | 0.2 | | 3.9 | 0.2 | |
| Delay (s) | | 46.2 | | | 47.7 | 48.4 | | 1.9 | | 6.4 | 1.1 | |
| Level of Service | | D | | | D | D | | A | | A | A | |
| Approach Delay (s) | | 46.2 | | | 48.3 | | | 1.9 | | | 1.7 | |
| Approach LOS | | D | | | D | | | A | | | A | |






















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.8 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.40 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 45.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Merced Street & Republic Ave

Baseline PM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|--|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  |  | |
| Volume (vph) | 54 | 3 | 17 | 84 | 4 | 540 | 2 | 917 | 26 | 156 | 669 | 41 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | |
| Flt Protected | | 0.96 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1710 | | | 1778 | 2787 | 1736 | 3471 | 1583 | 3433 | 3400 | | |
| Flt Permitted | | 0.71 | | | 0.71 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1252 | | | 1318 | 2787 | 1736 | 3471 | 1583 | 3433 | 3400 | | |
| 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) | 59 | 3 | 18 | 91 | 4 | 587 | 2 | 997 | 28 | 170 | 727 | 45 | |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 0 | 470 | 0 | 0 | 10 | 0 | 3 | 0 | |
| Lane Group Flow (vph) | 0 | 69 | 0 | 0 | 95 | 117 | 2 | 997 | 18 | 170 | 769 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 5 | | | | | 5 | |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 1 | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | |
| Actuated Green, G (s) | | 16.5 | | | 16.5 | 16.5 | 1.2 | 69.2 | 69.2 | 10.8 | 78.8 | | |
| Effective Green, g (s) | | 16.5 | | | 16.5 | 16.5 | 1.2 | 69.2 | 69.2 | 10.8 | 78.8 | | |
| Actuated g/C Ratio | | 0.15 | | | 0.15 | 0.15 | 0.01 | 0.63 | 0.63 | 0.10 | 0.72 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | | 187 | | | 197 | 418 | 18 | 2183 | 995 | 337 | 2435 | | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.29 | | c0.05 | 0.23 | | |
| v/s Ratio Perm | | 0.06 | | | c0.07 | 0.04 | | | 0.01 | | | | |
| v/c Ratio | | 0.37 | | | 0.48 | 0.28 | 0.11 | 0.46 | 0.02 | 0.50 | 0.32 | | |
| Uniform Delay, d1 | | 42.1 | | | 42.8 | 41.5 | 53.9 | 10.6 | 7.7 | 47.1 | 5.7 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.06 | 1.04 | 1.00 | 1.09 | 0.38 | | |
| Incremental Delay, d2 | | 1.2 | | | 1.9 | 0.4 | 2.7 | 0.7 | 0.0 | 1.2 | 0.3 | | |
| Delay (s) | | 43.3 | | | 44.7 | 41.8 | 59.6 | 11.7 | 7.7 | 52.6 | 2.5 | | |
| Level of Service | | D | | | D | D | E | B | A | D | A | | |
| Approach Delay (s) | | 43.3 | | | 42.2 | | | 11.7 | | | 11.6 | | |
| Approach LOS | | D | | | D | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.2 | | HCM 2000 Level of Service | | | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.47 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | Sum of lost time (s) | | | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 60.5% | | ICU Level of Service | | | | | B | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 31: Merced St/Merced Street & West Ave 140th

Baseline PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 47 | 41 | 13 | 514 | 707 | 30 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1651 | 3240 | 3219 | |
| Flt Permitted | 0.95 | 1.00 | 0.35 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 606 | 3240 | 3219 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 51 | 45 | 14 | 559 | 768 | 33 |
| RTOR Reduction (vph) | 0 | 40 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 51 | 5 | 14 | 559 | 797 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 5.6 | 5.6 | 40.4 | 40.4 | 40.4 | |
| Effective Green, g (s) | 5.6 | 5.6 | 40.4 | 40.4 | 40.4 | |
| Actuated g/C Ratio | 0.10 | 0.10 | 0.73 | 0.73 | 0.73 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 168 | 135 | 445 | 2379 | 2364 | |
| v/s Ratio Prot | c0.03 | | | 0.17 | c0.25 | |
| v/s Ratio Perm | | 0.00 | 0.02 | | | |
| v/c Ratio | 0.30 | 0.03 | 0.03 | 0.23 | 0.34 | |
| Uniform Delay, d1 | 22.9 | 22.3 | 2.0 | 2.3 | 2.6 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.54 | |
| Incremental Delay, d2 | 1.0 | 0.1 | 0.1 | 0.2 | 0.3 | |
| Delay (s) | 23.9 | 22.4 | 2.1 | 2.6 | 1.7 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.2 | | | 2.6 | 1.7 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.5 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.33 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 31.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |































c Critical Lane Group

Baseline Saturday

HCM Signalized Intersection Capacity Analysis

Baseline SAT

















1: Doolittle Dr & Davis St

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|--|---|--|---|---|--|---|---|--|--|--|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |   | |   |  |  |  |    |  |   |   |   | |
| Volume (vph) | 12 | 70 | 12 | 124 | 74 | 306 | 16 | 219 | 148 | 360 | 280 | 25 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3112 | | 3255 | 1689 | 1501 | 1620 | 4655 | 1435 | 3143 | 3193 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3112 | | 3255 | 1689 | 1501 | 1620 | 4655 | 1435 | 3143 | 3193 | | |
| 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) | 13 | 76 | 13 | 135 | 80 | 333 | 17 | 238 | 161 | 391 | 304 | 27 | |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 0 | 173 | 0 | 0 | 96 | 0 | 5 | 0 | |
| Lane Group Flow (vph) | 13 | 78 | 0 | 135 | 80 | 160 | 17 | 238 | 65 | 391 | 326 | 0 | |
| Confl. Peds. (#/hr) | | | 2 | | | | | | 1 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 0.7 | 11.0 | | 8.4 | 18.7 | 31.7 | 3.4 | 18.3 | 26.7 | 13.0 | 27.9 | | |
| Effective Green, g (s) | 0.7 | 11.0 | | 8.4 | 18.7 | 31.7 | 3.4 | 18.3 | 26.7 | 13.0 | 27.9 | | |
| Actuated g/C Ratio | 0.01 | 0.17 | | 0.13 | 0.28 | 0.48 | 0.05 | 0.28 | 0.40 | 0.20 | 0.42 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 17 | 518 | | 414 | 478 | 720 | 83 | 1290 | 580 | 619 | 1349 | | |
| v/s Ratio Prot | 0.01 | 0.03 | | c0.04 | 0.05 | c0.04 | 0.01 | c0.05 | 0.01 | c0.12 | c0.10 | | |
| v/s Ratio Perm | | | | | | 0.06 | | | 0.03 | | | | |
| v/c Ratio | 0.76 | 0.15 | | 0.33 | 0.17 | 0.22 | 0.20 | 0.18 | 0.11 | 0.63 | 0.24 | | |
| Uniform Delay, d1 | 32.6 | 23.5 | | 26.2 | 17.8 | 10.0 | 30.0 | 18.2 | 12.3 | 24.3 | 12.2 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 99.4 | 0.1 | | 0.2 | 0.2 | 0.1 | 0.4 | 0.1 | 0.0 | 1.6 | 0.2 | | |
| Delay (s) | 132.0 | 23.6 | | 26.4 | 18.0 | 10.0 | 30.5 | 18.3 | 12.3 | 25.9 | 12.4 | | |
| Level of Service | F | C | | C | B | B | C | B | B | C | B | | |
| Approach Delay (s) | | 37.4 | | | 15.2 | | | 16.4 | | | 19.7 | | |
| Approach LOS | | D | | | B | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 18.6 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.36 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 66.0 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 41.7% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

























10: Aurora Drive & Marina Boulevard

Baseline SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 20 | 196 | 10 | 21 | 265 | 17 | 4 | 16 | 32 | 13 | 17 | 15 |
| 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 |
| Hourly flow rate (vph) | 22 | 213 | 11 | 23 | 288 | 18 | 4 | 17 | 35 | 14 | 18 | 16 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 246 | 329 | 57 | 49 | | | | | | | | |
| Volume Left (vph) | 22 | 23 | 4 | 14 | | | | | | | | |
| Volume Right (vph) | 11 | 18 | 35 | 16 | | | | | | | | |
| Hadj (s) | 0.03 | 0.01 | -0.32 | -0.11 | | | | | | | | |
| Departure Headway (s) | 4.6 | 4.5 | 5.0 | 5.2 | | | | | | | | |
| Degree Utilization, x | 0.31 | 0.41 | 0.08 | 0.07 | | | | | | | | |
| Capacity (veh/h) | 761 | 777 | 641 | 611 | | | | | | | | |
| Control Delay (s) | 9.6 | 10.5 | 8.4 | 8.6 | | | | | | | | |
| Approach Delay (s) | 9.6 | 10.5 | 8.4 | 8.6 | | | | | | | | |
| Approach LOS | A | B | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 9.9 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 32.8% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

Baseline SAT

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 65 | 236 | 29 | 190 | 319 | 136 | 17 | 203 | 173 | 146 | 251 | 64 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 1739 | 1445 | 1620 | 1739 | 1414 | 1652 | 3240 | 1351 | 1620 | 2980 | | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 1739 | 1445 | 1620 | 1739 | 1414 | 1652 | 3240 | 1351 | 1620 | 2980 | | |
| 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) | 71 | 257 | 32 | 207 | 347 | 148 | 18 | 221 | 188 | 159 | 273 | 70 | |
| RTOR Reduction (vph) | 0 | 0 | 24 | 0 | 0 | 98 | 0 | 0 | 151 | 0 | 16 | 0 | |
| Lane Group Flow (vph) | 71 | 257 | 8 | 207 | 347 | 50 | 18 | 221 | 37 | 159 | 327 | 0 | |
| Confl. Peds. (#/hr) | | | 4 | | | 7 | | | | | | 3 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 8.7 | 21.4 | 21.4 | 17.8 | 30.5 | 30.5 | 2.9 | 17.7 | 17.7 | 15.7 | 30.5 | | |
| Effective Green, g (s) | 8.7 | 21.4 | 21.4 | 17.8 | 30.5 | 30.5 | 2.9 | 17.7 | 17.7 | 15.7 | 30.5 | | |
| Actuated g/C Ratio | 0.10 | 0.24 | 0.24 | 0.20 | 0.34 | 0.34 | 0.03 | 0.20 | 0.20 | 0.17 | 0.34 | | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 158 | 410 | 341 | 318 | 585 | 476 | 52 | 632 | 263 | 280 | 1003 | | |
| v/s Ratio Prot | 0.04 | 0.15 | | c0.13 | c0.20 | | 0.01 | 0.07 | | c0.10 | c0.11 | | |
| v/s Ratio Perm | | | 0.01 | | | 0.04 | | | 0.03 | | | | |
| v/c Ratio | 0.45 | 0.63 | 0.02 | 0.65 | 0.59 | 0.10 | 0.35 | 0.35 | 0.14 | 0.57 | 0.33 | | |
| Uniform Delay, d1 | 38.7 | 31.0 | 26.6 | 33.5 | 24.9 | 20.7 | 42.9 | 31.5 | 30.2 | 34.3 | 22.4 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 2.8 | 3.4 | 0.0 | 5.2 | 1.9 | 0.1 | 5.4 | 0.5 | 0.3 | 3.2 | 0.3 | | |
| Delay (s) | 41.4 | 34.4 | 26.6 | 38.7 | 26.8 | 20.8 | 48.3 | 31.9 | 30.5 | 37.5 | 22.7 | | |
| Level of Service | D | C | C | D | C | C | D | C | C | D | C | | |
| Approach Delay (s) | | 35.1 | | | 29.1 | | | 32.0 | | | 27.4 | | |
| Approach LOS | | D | | | C | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 30.4 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.57 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 90.6 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 53.3% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: Merced St & Marina Blvd

Baseline SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 41 | 572 | 62 | 604 | 547 | 107 | 108 | 202 | 677 | 167 | 156 | 24 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4579 | | 3255 | 3153 | | 1678 | 3355 | 2722 | 3255 | 3240 | 1469 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4579 | | 3255 | 3153 | | 1678 | 3355 | 2722 | 3255 | 3240 | 1469 |
| 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) | 45 | 622 | 67 | 657 | 595 | 116 | 117 | 220 | 736 | 182 | 170 | 26 |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| Lane Group Flow (vph) | 45 | 679 | 0 | 657 | 699 | 0 | 117 | 220 | 736 | 182 | 170 | 5 |
| Confl. Peds. (#/hr) | | | 4 | | | 2 | | | 3 | | | 3 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 9.0 | 25.5 | | 42.0 | 58.5 | | 20.0 | 28.0 | 70.0 | 15.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 9.0 | 27.0 | | 42.0 | 60.0 | | 20.0 | 29.5 | 70.0 | 15.0 | 24.5 | 24.5 |
| Actuated g/C Ratio | 0.07 | 0.21 | | 0.32 | 0.46 | | 0.15 | 0.23 | 0.54 | 0.12 | 0.19 | 0.19 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 108 | 954 | | 1055 | 1460 | | 259 | 764 | 1471 | 377 | 612 | 277 |
| v/s Ratio Prot | 0.03 | c0.15 | | c0.20 | 0.22 | | 0.07 | 0.07 | c0.27 | c0.06 | 0.05 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 |
| v/c Ratio | 0.42 | 0.71 | | 0.62 | 0.48 | | 0.45 | 0.29 | 0.50 | 0.48 | 0.28 | 0.02 |
| Uniform Delay, d1 | 57.7 | 47.6 | | 37.0 | 24.0 | | 49.8 | 41.3 | 18.7 | 53.6 | 44.9 | 42.7 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 3.5 | 2.7 | | 2.8 | 0.3 | | 5.6 | 0.3 | 0.4 | 4.4 | 0.3 | 0.0 |
| Delay (s) | 61.3 | 50.3 | | 39.8 | 24.3 | | 55.4 | 41.6 | 19.1 | 58.0 | 45.3 | 42.7 |
| Level of Service | E | D | | D | C | | E | D | B | E | D | D |
| Approach Delay (s) | | 51.0 | | | 31.8 | | | 27.7 | | | 51.2 | |
| Approach LOS | | D | | | C | | | C | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 36.6 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.59 | D |
| Actuated Cycle Length (s) | 129.5 | Sum of lost time (s) |
| Intersection Capacity Utilization | 73.7% | ICU Level of Service |
| Analysis Period (min) | 15 | D |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Baseline SAT



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↙ | ↑↑ | | ↗ |
| Volume (veh/h) | 1416 | 0 | 0 | 1241 | 0 | 24 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1539 | 0 | 0 | 1349 | 0 | 26 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | 450 | | |
| pX, platoon unblocked | | | | 0.93 | 0.95 | 0.93 |
| vC, conflicting volume | | | | 1539 | 2214 | 385 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | | 1185 | 1589 | 0 |
| tC, single (s) | | | | 4.1 | 6.8 | 6.9 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | | 2.2 | 3.5 | 3.3 |
| p0 queue free % | | | | 100 | 100 | 97 |
| cM capacity (veh/h) | | | | 542 | 93 | 1005 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total | 440 | 440 | 440 | 220 | 0 | 674 | 674 | 26 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1005 |
| Volume to Capacity | 0.26 | 0.26 | 0.26 | 0.13 | 0.00 | 0.40 | 0.40 | 0.03 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.7 |
| Lane LOS | | | | | | | | A |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | 8.7 |
| Approach LOS | | | | | | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 37.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Baseline SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|-------|------|------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 907 | 604 | 476 | 738 | 0 | 0 | 0 | 431 | 0 | 0 | 503 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 986 | 657 | 517 | 802 | 0 | 0 | 0 | 468 | 0 | 0 | 547 | |
| RTOR Reduction (vph) | 0 | 0 | 389 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 333 | |
| Lane Group Flow (vph) | 0 | 986 | 268 | 517 | 802 | 0 | 0 | 0 | 468 | 0 | 0 | 214 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 29.5 | 29.5 | 13.7 | 50.2 | | | | 15.6 | | | 15.6 | |
| Effective Green, g (s) | | 29.5 | 29.5 | 13.7 | 50.2 | | | | 15.6 | | | 15.6 | |
| Actuated g/C Ratio | | 0.41 | 0.41 | 0.19 | 0.69 | | | | 0.22 | | | 0.22 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1368 | 1077 | 595 | 2329 | | | | 628 | | | 601 | |
| v/s Ratio Prot | | c0.29 | | c0.16 | 0.24 | | | | c0.16 | | | 0.08 | |
| v/s Ratio Perm | | | 0.10 | | | | | | | | | | |
| v/c Ratio | | 0.72 | 0.25 | 0.87 | 0.34 | | | | 0.75 | | | 0.36 | |
| Uniform Delay, d1 | | 17.9 | 14.1 | 28.4 | 4.4 | | | | 26.5 | | | 24.1 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 1.9 | 0.1 | 12.8 | 0.1 | | | | 4.8 | | | 0.4 | |
| Delay (s) | | 19.8 | 14.2 | 41.2 | 4.5 | | | | 31.3 | | | 24.4 | |
| Level of Service | | B | B | D | A | | | | C | | | C | |
| Approach Delay (s) | | 17.6 | | | 18.9 | | | 31.3 | | | 24.4 | | |
| Approach LOS | | B | | | B | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.6 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.76 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 72.3 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 47.6% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps

Baseline SAT





















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↵ | ↑↑↑ | ↑↑ | ↵ | | |
| Volume (vph) | 494 | 0 | 762 | 519 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 537 | 0 | 828 | 564 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 118 | 0 | 0 |
| Lane Group Flow (vph) | 537 | 0 | 828 | 446 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 20.7 | | 20.8 | 20.8 | | |
| Effective Green, g (s) | 20.7 | | 20.8 | 20.8 | | |
| Actuated g/C Ratio | 0.41 | | 0.41 | 0.41 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 664 | | 1381 | 630 | | |
| v/s Ratio Prot | c0.33 | | 0.25 | | | |
| v/s Ratio Perm | | | | c0.29 | | |
| v/c Ratio | 0.81 | | 0.60 | 0.71 | | |
| Uniform Delay, d1 | 13.2 | | 11.6 | 12.3 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 7.2 | | 0.7 | 3.6 | | |
| Delay (s) | 20.3 | | 12.3 | 16.0 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 20.3 | 13.8 | | 0.0 | |
| Approach LOS | | C | B | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 15.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.76 | | |
| Actuated Cycle Length (s) | 50.5 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 67.0% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Baseline SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 4 | 123 | 10 | 24 | 110 | 16 | 15 | 18 | 32 | 14 | 9 | 15 |
| 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 |
| Hourly flow rate (vph) | 4 | 134 | 11 | 26 | 120 | 17 | 16 | 20 | 35 | 15 | 10 | 16 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 4 | 145 | 163 | 71 | 41 | | | | | | | |
| Volume Left (vph) | 4 | 0 | 26 | 16 | 15 | | | | | | | |
| Volume Right (vph) | 0 | 11 | 17 | 35 | 16 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | 0.00 | -0.22 | -0.13 | | | | | | | |
| Departure Headway (s) | 5.4 | 4.9 | 4.4 | 4.5 | 4.6 | | | | | | | |
| Degree Utilization, x | 0.01 | 0.20 | 0.20 | 0.09 | 0.05 | | | | | | | |
| Capacity (veh/h) | 645 | 713 | 777 | 748 | 720 | | | | | | | |
| Control Delay (s) | 7.3 | 7.9 | 8.6 | 7.9 | 7.8 | | | | | | | |
| Approach Delay (s) | 7.8 | | 8.6 | 7.9 | 7.8 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.1 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 29.5% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

Baseline SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 59 | 103 | 51 | 38 | 94 | 81 | 47 | 241 | 33 | 99 | 239 | 61 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.97 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1705 | 1254 | 1615 | 1739 | 1322 | 1711 | 3022 | | 1620 | 2982 | |
| Flt Permitted | | 0.84 | 1.00 | 0.65 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1454 | 1254 | 1098 | 1739 | 1322 | 1711 | 3022 | | 1620 | 2982 | |
| 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) | 64 | 112 | 55 | 41 | 102 | 88 | 51 | 262 | 36 | 108 | 260 | 66 |
| RTOR Reduction (vph) | 0 | 0 | 44 | 0 | 0 | 71 | 0 | 13 | 0 | 0 | 24 | 0 |
| Lane Group Flow (vph) | 0 | 176 | 11 | 41 | 102 | 17 | 51 | 285 | 0 | 108 | 302 | 0 |
| Confl. Peds. (#/hr) | 7 | | 4 | 7 | | 7 | | | | | | 3 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 2.8 | 19.5 | | 7.3 | 24.0 | |
| Effective Green, g (s) | | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 2.8 | 19.5 | | 7.3 | 24.0 | |
| Actuated g/C Ratio | | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.05 | 0.37 | | 0.14 | 0.46 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 287 | 247 | 217 | 343 | 261 | 91 | 1131 | | 226 | 1373 | |
| v/s Ratio Prot | | | | | 0.06 | | 0.03 | c0.09 | | c0.07 | c0.10 | |
| v/s Ratio Perm | | c0.12 | 0.01 | 0.04 | | 0.01 | | | | | | |
| v/c Ratio | | 0.61 | 0.04 | 0.19 | 0.30 | 0.07 | 0.56 | 0.25 | | 0.48 | 0.22 | |
| Uniform Delay, d1 | | 19.1 | 16.9 | 17.4 | 17.8 | 17.0 | 24.0 | 11.3 | | 20.6 | 8.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 3.9 | 0.1 | 0.4 | 0.5 | 0.1 | 7.7 | 0.2 | | 1.6 | 0.1 | |
| Delay (s) | | 22.9 | 17.0 | 17.8 | 18.3 | 17.1 | 31.7 | 11.4 | | 22.2 | 8.5 | |
| Level of Service | | C | B | B | B | B | C | B | | C | A | |
| Approach Delay (s) | | 21.5 | | | 17.8 | | | 14.4 | | | 11.9 | |
| Approach LOS | | C | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 15.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.38 | | |
| Actuated Cycle Length (s) | 52.1 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 41.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

Baseline SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|-------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 113 | 126 | 66 | 71 | 126 | 53 | 41 | 409 | 56 | 33 | 394 | 69 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1593 | 1863 | 1348 | 1593 | 1863 | 1372 | 1652 | 3166 | | 1593 | 3151 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1593 | 1863 | 1348 | 1593 | 1863 | 1372 | 1652 | 3166 | | 1593 | 3151 | |
| 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) | 123 | 137 | 72 | 77 | 137 | 58 | 45 | 445 | 61 | 36 | 428 | 75 |
| RTOR Reduction (vph) | 0 | 0 | 54 | 0 | 0 | 45 | 0 | 7 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 123 | 137 | 18 | 77 | 137 | 13 | 45 | 499 | 0 | 36 | 493 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | | | | 2 | | | 3 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 13.9 | 25.5 | 25.5 | 11.8 | 23.4 | 23.4 | 5.8 | 40.5 | | 5.6 | 40.3 | |
| Effective Green, g (s) | 13.9 | 25.5 | 25.5 | 11.8 | 23.4 | 23.4 | 5.8 | 40.5 | | 5.6 | 40.3 | |
| Actuated g/C Ratio | 0.14 | 0.25 | 0.25 | 0.12 | 0.23 | 0.23 | 0.06 | 0.40 | | 0.05 | 0.39 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 216 | 463 | 335 | 183 | 425 | 313 | 93 | 1252 | | 87 | 1240 | |
| v/s Ratio Prot | c0.08 | 0.07 | | c0.05 | c0.07 | | 0.03 | c0.16 | | 0.02 | c0.16 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.57 | 0.30 | 0.05 | 0.42 | 0.32 | 0.04 | 0.48 | 0.40 | | 0.41 | 0.40 | |
| Uniform Delay, d1 | 41.4 | 31.2 | 29.3 | 42.1 | 32.9 | 30.8 | 46.8 | 22.2 | | 46.8 | 22.3 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.1 | 0.5 | 0.1 | 2.1 | 0.6 | 0.1 | 5.3 | 1.0 | | 4.3 | 0.6 | |
| Delay (s) | 45.6 | 31.7 | 29.4 | 44.2 | 33.5 | 30.8 | 52.2 | 23.2 | | 51.1 | 22.9 | |
| Level of Service | D | C | C | D | C | C | D | C | | D | C | |
| Approach Delay (s) | | 36.3 | | | 36.0 | | | 25.5 | | | 24.8 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 29.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.42 | | |
| Actuated Cycle Length (s) | 102.4 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 60.6% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

Baseline + Project AM

HCM Signalized Intersection Capacity Analysis

Baseline + Project AM

1: Doolittle Dr & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|------|-------|------|-------|-------|------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↖ | ↖ | ↗ | ↗ | ↖ | ↗ | ↗ |
| Volume (vph) | 26 | 94 | 35 | 243 | 102 | 737 | 46 | 849 | 213 | 340 | 382 | 44 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3065 | | 3255 | 1689 | 1490 | 1620 | 4655 | 1434 | 3143 | 3180 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3065 | | 3255 | 1689 | 1490 | 1620 | 4655 | 1434 | 3143 | 3180 | |
| 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) | 28 | 102 | 38 | 264 | 111 | 801 | 50 | 923 | 232 | 370 | 415 | 48 |
| RTOR Reduction (vph) | 0 | 32 | 0 | 0 | 0 | 187 | 0 | 0 | 131 | 0 | 7 | 0 |
| Lane Group Flow (vph) | 28 | 108 | 0 | 264 | 111 | 614 | 50 | 923 | 101 | 370 | 456 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 2.5 | 14.0 | | 11.2 | 22.7 | 40.7 | 14.4 | 25.5 | 36.7 | 18.0 | 29.1 | |
| Effective Green, g (s) | 2.5 | 14.0 | | 11.2 | 22.7 | 40.7 | 14.4 | 25.5 | 36.7 | 18.0 | 29.1 | |
| Actuated g/C Ratio | 0.03 | 0.17 | | 0.13 | 0.27 | 0.48 | 0.17 | 0.30 | 0.44 | 0.21 | 0.35 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 49 | 510 | | 434 | 456 | 721 | 277 | 1413 | 626 | 673 | 1101 | |
| v/s Ratio Prot | 0.02 | 0.04 | | c0.08 | 0.07 | c0.18 | 0.03 | c0.20 | 0.02 | 0.12 | 0.14 | |
| v/s Ratio Perm | | | | | | 0.23 | | | 0.05 | | | |
| v/c Ratio | 0.57 | 0.21 | | 0.61 | 0.24 | 0.85 | 0.18 | 0.65 | 0.16 | 0.55 | 0.41 | |
| Uniform Delay, d1 | 40.2 | 30.2 | | 34.3 | 23.9 | 19.0 | 29.8 | 25.4 | 14.3 | 29.4 | 20.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 9.6 | 0.2 | | 1.7 | 0.3 | 9.2 | 0.1 | 1.2 | 0.0 | 0.5 | 0.4 | |
| Delay (s) | 49.8 | 30.4 | | 36.0 | 24.2 | 28.2 | 29.9 | 26.6 | 14.4 | 29.9 | 21.4 | |
| Level of Service | D | C | | D | C | C | C | C | B | C | C | |
| Approach Delay (s) | | 33.7 | | | 29.6 | | | 24.4 | | | 25.2 | |
| Approach LOS | | C | | | C | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 26.8 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.78 | | |
| Actuated Cycle Length (s) | 84.0 | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | 76.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2: Phillips Ln & Davis St

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|-------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 76 | 548 | 10 | 22 | 1121 | 122 | 24 | 0 | 85 | 85 | 1 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3169 | | 1620 | 3069 | 1323 | 1678 | 1429 | | 3143 | 1395 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.33 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3169 | | 1620 | 3069 | 1323 | 574 | 1429 | | 3143 | 1395 | |
| 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) | 83 | 596 | 11 | 24 | 1218 | 133 | 26 | 0 | 92 | 92 | 1 | 58 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 0 | 40 | 0 | 81 | 0 | 0 | 50 | 0 |
| Lane Group Flow (vph) | 83 | 606 | 0 | 24 | 1231 | 80 | 26 | 11 | 0 | 92 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 9.7 | 61.6 | | 4.3 | 56.2 | 70.0 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Effective Green, g (s) | 9.7 | 61.6 | | 4.3 | 56.2 | 70.0 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.09 | 0.59 | | 0.04 | 0.54 | 0.67 | 0.12 | 0.12 | | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 149 | 1859 | | 66 | 1642 | 882 | 67 | 167 | | 413 | 183 | |
| v/s Ratio Prot | c0.05 | 0.19 | | 0.01 | c0.40 | 0.01 | | 0.01 | | c0.03 | | |
| v/s Ratio Perm | | | | | | 0.05 | c0.05 | | | | | 0.01 |
| v/c Ratio | 0.56 | 0.33 | | 0.36 | 0.75 | 0.09 | 0.39 | 0.06 | | 0.22 | 0.05 | |
| Uniform Delay, d1 | 45.6 | 11.1 | | 49.0 | 18.9 | 6.2 | 42.9 | 41.2 | | 40.8 | 39.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.16 | 0.83 | 1.23 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.6 | 0.5 | | 1.0 | 2.5 | 0.0 | 1.4 | 0.1 | | 0.3 | 0.1 | |
| Delay (s) | 48.1 | 11.6 | | 57.7 | 18.1 | 7.7 | 44.2 | 41.3 | | 41.1 | 40.0 | |
| Level of Service | D | B | | E | B | A | D | D | | D | D | |
| Approach Delay (s) | | 16.0 | | | 17.9 | | | 41.9 | | | 40.6 | |
| Approach LOS | | B | | | B | | | D | | | D | |



























Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 20.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.60 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 65.6% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Westgate Pkwy/Warden Ave & Davis St

Baseline + Project AM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|--|--|---|--|---|--|---|--|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |    | |   |   | | |  |   |  |   | | |
| Volume (vph) | 6 | 662 | 50 | 222 | 1184 | 41 | 68 | 30 | 150 | 118 | 56 | 24 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 | |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | | 1.00 | 0.88 | 1.00 | 1.00 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.96 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.97 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1620 | 4521 | | 3143 | 3305 | | | 1825 | 2807 | 1562 | 1551 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.74 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1620 | 4521 | | 3143 | 3305 | | | 1406 | 2807 | 1562 | 1551 | | |
| 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) | 7 | 720 | 54 | 241 | 1287 | 45 | 74 | 33 | 163 | 128 | 61 | 26 | |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 2 | 0 | 0 | 0 | 121 | 0 | 15 | 0 | |
| Lane Group Flow (vph) | 7 | 767 | 0 | 241 | 1330 | 0 | 0 | 107 | 42 | 128 | 72 | 0 | |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 | |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | | |
| Permitted Phases | | | | | | | 8 | | 8 | | | | |
| Actuated Green, G (s) | 1.0 | 50.7 | | 13.9 | 64.1 | | | 13.1 | 27.0 | 13.8 | 13.8 | | |
| Effective Green, g (s) | 1.0 | 50.7 | | 13.9 | 64.1 | | | 13.1 | 27.0 | 13.8 | 13.8 | | |
| Actuated g/C Ratio | 0.01 | 0.48 | | 0.13 | 0.61 | | | 0.12 | 0.26 | 0.13 | 0.13 | | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | | |
| Lane Grp Cap (vph) | 15 | 2182 | | 416 | 2017 | | | 175 | 721 | 205 | 203 | | |
| v/s Ratio Prot | c0.00 | 0.17 | | 0.08 | c0.40 | | | | 0.01 | c0.08 | 0.05 | | |
| v/s Ratio Perm | | | | | | | | c0.08 | 0.01 | | | | |
| v/c Ratio | 0.47 | 0.35 | | 0.58 | 0.66 | | | 0.61 | 0.06 | 0.62 | 0.36 | | |
| Uniform Delay, d1 | 51.7 | 16.9 | | 42.8 | 13.3 | | | 43.5 | 29.4 | 43.1 | 41.6 | | |
| Progression Factor | 0.80 | 0.63 | | 1.15 | 0.76 | | | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 7.9 | 0.4 | | 0.9 | 1.3 | | | 4.4 | 0.0 | 4.2 | 0.4 | | |
| Delay (s) | 49.5 | 11.1 | | 50.1 | 11.5 | | | 47.9 | 29.4 | 47.4 | 41.9 | | |
| Level of Service | D | B | | D | B | | | D | C | D | D | | |
| Approach Delay (s) | | 11.4 | | | 17.4 | | | 36.8 | | | 45.2 | | |
| Approach LOS | | B | | | B | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 19.7 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.65 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 68.2% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: I-880 SB ramps & Davis St/Davis Street

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|--------|------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 542 | 381 | 0 | 1110 | 386 | 0 | 0 | 0 | 194 | 0 | 366 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.96 | | | | | 1.00 | 0.86 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3108 | | | | | 1681 | 1421 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3108 | | | | | 1681 | 1421 | 1461 |
| 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 | 589 | 414 | 0 | 1207 | 420 | 0 | 0 | 0 | 211 | 0 | 398 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 49 | 49 |
| Lane Group Flow (vph) | 0 | 589 | 414 | 0 | 1605 | 0 | 0 | 0 | 0 | 190 | 163 | 158 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 74.6 | 105.0 | | 74.6 | | | | | 22.4 | 22.4 | 22.4 |
| Effective Green, g (s) | | 74.6 | 105.0 | | 74.6 | | | | | 22.4 | 22.4 | 22.4 |
| Actuated g/C Ratio | | 0.71 | 1.00 | | 0.71 | | | | | 0.21 | 0.21 | 0.21 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2338 | 1439 | | 2208 | | | | | 358 | 303 | 311 |
| v/s Ratio Prot | | 0.18 | | | c0.52 | | | | | 0.11 | c0.11 | 0.11 |
| v/s Ratio Perm | | | 0.29 | | | | | | | | | |
| v/c Ratio | | 0.25 | 0.29 | | 0.73 | | | | | 0.53 | 0.54 | 0.51 |
| Uniform Delay, d1 | | 5.4 | 0.0 | | 9.1 | | | | | 36.6 | 36.7 | 36.4 |
| Progression Factor | | 0.63 | 1.00 | | 0.87 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.2 | 0.1 | | 2.0 | | | | | 1.5 | 1.8 | 1.3 |
| Delay (s) | | 3.6 | 0.1 | | 9.9 | | | | | 38.2 | 38.6 | 37.8 |
| Level of Service | | A | A | | A | | | | | D | D | D |
| Approach Delay (s) | | 2.2 | | | 9.9 | | | 0.0 | | | 38.2 | |
| Approach LOS | | A | | | A | | | A | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 12.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 64.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

Baseline + Project AM






















| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|-------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↑↑↑ | ↑ |
| Volume (vph) | 515 | 399 | 0 | 1077 | 399 | 185 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Frt | 0.93 | | | 1.00 | 0.99 | 0.85 |
| Flt Protected | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3307 | | | 3539 | 3426 | 1441 |
| Flt Permitted | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3307 | | | 3539 | 3426 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 560 | 434 | 0 | 1171 | 434 | 201 |
| RTOR Reduction (vph) | 77 | 0 | 0 | 0 | 4 | 149 |
| Lane Group Flow (vph) | 917 | 0 | 0 | 1171 | 450 | 32 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 79.6 | | | 79.6 | 18.4 | 18.4 |
| Effective Green, g (s) | 79.6 | | | 79.6 | 18.4 | 18.4 |
| Actuated g/C Ratio | 0.76 | | | 0.76 | 0.18 | 0.18 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2507 | | | 2682 | 600 | 252 |
| v/s Ratio Prot | 0.28 | | | c0.33 | c0.13 | 0.02 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.37 | | | 0.44 | 0.75 | 0.13 |
| Uniform Delay, d1 | 4.3 | | | 4.6 | 41.1 | 36.5 |
| Progression Factor | 1.06 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.4 | | | 0.5 | 4.5 | 0.1 |
| Delay (s) | 4.9 | | | 5.1 | 45.6 | 36.6 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 4.9 | | | 5.1 | 43.0 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 13.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.50 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 49.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
6: Doolittle Dr & Williams St

Baseline + Project AM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  |  |  |  | |  |  | | |
| Volume (vph) | 104 | 126 | 19 | 79 | 88 | 138 | 24 | 940 | 85 | 46 | 429 | 57 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | | |
| Flt Protected | | 0.98 | | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1533 | | | 1691 | 1303 | 1620 | 3034 | | 1562 | 3013 | | |
| Flt Permitted | | 0.75 | | | 0.73 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1179 | | | 1263 | 1303 | 1620 | 3034 | | 1562 | 3013 | | |
| 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) | 113 | 137 | 21 | 86 | 96 | 150 | 26 | 1022 | 92 | 50 | 466 | 62 | |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 108 | 0 | 7 | 0 | 0 | 11 | 0 | |
| Lane Group Flow (vph) | 0 | 267 | 0 | 0 | 182 | 42 | 26 | 1107 | 0 | 50 | 517 | 0 | |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | 5 | | 2 | 2 | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 19.4 | | | 19.4 | 19.4 | 3.2 | 30.9 | | 5.4 | 32.6 | | |
| Effective Green, g (s) | | 19.4 | | | 19.4 | 19.4 | 3.2 | 30.9 | | 5.4 | 32.6 | | |
| Actuated g/C Ratio | | 0.28 | | | 0.28 | 0.28 | 0.05 | 0.45 | | 0.08 | 0.47 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 331 | | | 355 | 366 | 75 | 1360 | | 122 | 1425 | | |
| v/s Ratio Prot | | | | | | | 0.02 | c0.36 | | c0.03 | 0.17 | | |
| v/s Ratio Perm | | c0.23 | | | 0.14 | 0.03 | | | | | | | |
| v/c Ratio | | 0.81 | | | 0.51 | 0.12 | 0.35 | 0.81 | | 0.41 | 0.36 | | |
| Uniform Delay, d1 | | 23.0 | | | 20.8 | 18.4 | 31.8 | 16.5 | | 30.2 | 11.5 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 14.1 | | | 1.7 | 0.2 | 3.8 | 4.1 | | 3.0 | 0.2 | | |
| Delay (s) | | 37.2 | | | 22.4 | 18.6 | 35.6 | 20.6 | | 33.3 | 11.8 | | |
| Level of Service | | D | | | C | B | D | C | | C | B | | |
| Approach Delay (s) | | 37.2 | | | 20.7 | | | 20.9 | | | 13.6 | | |
| Approach LOS | | D | | | C | | | C | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.0 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.78 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 68.9 | | | | | | | | | Sum of lost time (s) | 13.7 |
| Intersection Capacity Utilization | | | 67.4% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
7: Williams St & Westgate Pkwy

Baseline + Project AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 30 | 249 | 359 | 191 | 129 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 33 | 271 | 390 | 208 | 140 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 54 | 0 | 49 |
| Lane Group Flow (vph) | 33 | 271 | 390 | 154 | 140 | 8 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 4.8 | 86.3 | 77.5 | 77.5 | 15.1 | 15.1 |
| Effective Green, g (s) | 4.8 | 86.3 | 77.5 | 77.5 | 15.1 | 15.1 |
| Actuated g/C Ratio | 0.04 | 0.78 | 0.70 | 0.70 | 0.14 | 0.14 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 70 | 1433 | 1201 | 1096 | 214 | 185 |
| v/s Ratio Prot | c0.02 | 0.15 | c0.23 | | c0.09 | |
| v/s Ratio Perm | | | | 0.10 | | 0.01 |
| v/c Ratio | 0.47 | 0.19 | 0.32 | 0.14 | 0.65 | 0.04 |
| Uniform Delay, d1 | 51.4 | 3.0 | 6.2 | 5.3 | 45.0 | 41.2 |
| Progression Factor | 1.00 | 1.00 | 1.19 | 1.70 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.8 | 0.3 | 0.6 | 0.2 | 7.0 | 0.1 |
| Delay (s) | 53.2 | 3.3 | 8.0 | 9.3 | 52.0 | 41.3 |
| Level of Service | D | A | A | A | D | D |
| Approach Delay (s) | | 8.7 | 8.4 | | 48.9 | |
| Approach LOS | | A | A | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 15.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.38 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 40.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis Baseline + Project AM
 8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway




















| Movement | EBT | EBR | WBL | WBT | WBR | NBL2 | NBL | NBR | SBT | SEL | SER |
|------------------------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | ↑ | ↗ | ↖ | ↘ | | | ↖ | ↗ | ↕ | ↘ | ↖ |
| Volume (vph) | 287 | 107 | 193 | 312 | 1 | 279 | 5 | 225 | 7 | 0 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 9 | 10 | 10 | 11 | 11 | 16 | 12 | 12 | 12 |
| Total Lost time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.97 | 1.00 | 1.00 | | | 1.00 | 0.97 | 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 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.86 | |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| 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 |
| Adj. Flow (vph) | 312 | 116 | 210 | 339 | 1 | 303 | 5 | 245 | 8 | 0 | 8 |
| RTOR Reduction (vph) | 0 | 72 | 0 | 0 | 0 | 0 | 0 | 127 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 312 | 44 | 210 | 340 | 0 | 0 | 308 | 118 | 8 | 8 | 0 |
| Confl. Peds. (#/hr) | | 14 | | | | | | 2 | | 2 | |
| Confl. Bikes (#/hr) | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Turn Type | NA | Perm | Prot | NA | | Prot | Prot | Perm | NA | Prot | |
| Protected Phases | 2 | | 1 | 6 | | 4 | 4 | | 8 | 7 | |
| Permitted Phases | | 2 | | | | | | 4 | | | |
| Actuated Green, G (s) | 42.1 | 42.1 | 18.9 | 65.0 | | | 24.6 | 24.6 | 1.4 | 2.4 | |
| Effective Green, g (s) | 42.1 | 42.1 | 18.9 | 65.0 | | | 24.6 | 24.6 | 1.4 | 2.4 | |
| Actuated g/C Ratio | 0.38 | 0.38 | 0.17 | 0.59 | | | 0.22 | 0.22 | 0.01 | 0.02 | |
| Clearance Time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 673 | 551 | 268 | 1006 | | | 375 | 382 | 23 | 34 | |
| v/s Ratio Prot | c0.18 | | c0.13 | 0.20 | | | c0.18 | | c0.00 | c0.01 | |
| v/s Ratio Perm | | 0.03 | | | | | | 0.07 | | | |
| v/c Ratio | 0.46 | 0.08 | 0.78 | 0.34 | | | 0.82 | 0.31 | 0.35 | 0.24 | |
| Uniform Delay, d1 | 25.5 | 21.6 | 43.6 | 11.5 | | | 40.6 | 35.6 | 53.8 | 52.9 | |
| Progression Factor | 0.96 | 1.21 | 1.00 | 1.00 | | | 0.98 | 1.02 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 0.3 | 13.9 | 0.9 | | | 12.1 | 0.4 | 8.9 | 3.5 | |
| Delay (s) | 26.6 | 26.4 | 57.5 | 12.4 | | | 51.9 | 36.9 | 62.8 | 56.4 | |
| Level of Service | C | C | E | B | | | D | D | E | E | |
| Approach Delay (s) | 26.6 | | | 29.6 | | | | | 62.8 | 56.4 | |
| Approach LOS | C | | | C | | | | | E | E | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 34.7 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.62 | C |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 80.3% | ICU Level of Service |
| Analysis Period (min) | 15 | D |

c Critical Lane Group

















HCM Unsignalized Intersection Capacity Analysis
 9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

Baseline + Project AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  |  | | |  |  | | |
| Volume (veh/h) | 1 | 268 | 5 | 0 | 627 | 14 | 0 | 0 | 15 | 26 | 0 | 9 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 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 |
| Hourly flow rate (vph) | 1 | 291 | 5 | 0 | 682 | 15 | 0 | 0 | 16 | 28 | 0 | 10 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 697 | | | 297 | | | 987 | 993 | 294 | 994 | 980 | 682 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 697 | | | 297 | | | 987 | 993 | 294 | 994 | 980 | 682 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 98 | 87 | 100 | 98 |
| cM capacity (veh/h) | 899 | | | 1265 | | | 221 | 245 | 745 | 219 | 249 | 450 |
| Direction, Lane # | EB 1 | WB 1 | WB 2 | NB 1 | SB 1 | | | | | | | |
| Volume Total | 298 | 682 | 15 | 16 | 38 | | | | | | | |
| Volume Left | 1 | 0 | 0 | 0 | 28 | | | | | | | |
| Volume Right | 5 | 0 | 15 | 16 | 10 | | | | | | | |
| cSH | 899 | 1700 | 1700 | 745 | 252 | | | | | | | |
| Volume to Capacity | 0.00 | 0.40 | 0.01 | 0.02 | 0.15 | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | 2 | 13 | | | | | | | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 9.9 | 21.8 | | | | | | | |
| Lane LOS | A | | | A | C | | | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 9.9 | 21.8 | | | | | | | |
| Approach LOS | | | | A | C | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | 1.0 | | | | | | | | |
| Intersection Capacity Utilization | | | Err% | | ICU Level of Service | | | | H | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

Baseline + Project AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 49 | 301 | 13 | 23 | 571 | 79 | 16 | 131 | 51 | 43 | 52 | 26 |
| 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 |
| Hourly flow rate (vph) | 53 | 327 | 14 | 25 | 621 | 86 | 17 | 142 | 55 | 47 | 57 | 28 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 395 | 732 | 215 | 132 | | | | | | | | |
| Volume Left (vph) | 53 | 25 | 17 | 47 | | | | | | | | |
| Volume Right (vph) | 14 | 86 | 55 | 28 | | | | | | | | |
| Hadj (s) | 0.04 | -0.03 | -0.10 | -0.02 | | | | | | | | |
| Departure Headway (s) | 6.4 | 6.0 | 7.1 | 7.5 | | | | | | | | |
| Degree Utilization, x | 0.70 | 1.0 | 0.42 | 0.27 | | | | | | | | |
| Capacity (veh/h) | 548 | 598 | 472 | 435 | | | | | | | | |
| Control Delay (s) | 22.7 | 134.2 | 15.2 | 13.3 | | | | | | | | |
| Approach Delay (s) | 22.7 | 134.2 | 15.2 | 13.3 | | | | | | | | |
| Approach LOS | C | F | C | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 76.1 | | | | | | | | | |
| Level of Service | | | F | | | | | | | | | |
| Intersection Capacity Utilization | | | 63.8% | ICU Level of Service | B | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

Baseline + Project AM

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|-------|-------|-------|------|------|-------|------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 131 | 305 | 72 | 138 | 530 | 322 | 15 | 610 | 248 | 178 | 230 | 121 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1450 | 1620 | 1739 | 1394 | 1652 | 3240 | 1332 | 1620 | 2909 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1450 | 1620 | 1739 | 1394 | 1652 | 3240 | 1332 | 1620 | 2909 | |
| 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) | 142 | 332 | 78 | 150 | 576 | 350 | 16 | 663 | 270 | 193 | 250 | 132 |
| RTOR Reduction (vph) | 0 | 0 | 60 | 0 | 0 | 164 | 0 | 0 | 102 | 0 | 42 | 0 |
| Lane Group Flow (vph) | 142 | 332 | 18 | 150 | 576 | 186 | 16 | 663 | 168 | 193 | 340 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 16.0 | 25.6 | 25.6 | 16.7 | 26.3 | 26.3 | 3.1 | 31.0 | 31.0 | 19.7 | 47.6 | |
| Effective Green, g (s) | 16.0 | 25.6 | 25.6 | 16.7 | 26.3 | 26.3 | 3.1 | 31.0 | 31.0 | 19.7 | 47.6 | |
| Actuated g/C Ratio | 0.14 | 0.23 | 0.23 | 0.15 | 0.24 | 0.24 | 0.03 | 0.28 | 0.28 | 0.18 | 0.43 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 238 | 401 | 334 | 243 | 412 | 330 | 46 | 904 | 372 | 287 | 1247 | |
| v/s Ratio Prot | 0.09 | 0.19 | | c0.09 | c0.33 | | 0.01 | c0.20 | | c0.12 | 0.12 | |
| v/s Ratio Perm | | | 0.01 | | | 0.13 | | | 0.13 | | | |
| v/c Ratio | 0.60 | 0.83 | 0.05 | 0.62 | 1.40 | 0.56 | 0.35 | 0.73 | 0.45 | 0.67 | 0.27 | |
| Uniform Delay, d1 | 44.5 | 40.6 | 33.3 | 44.2 | 42.4 | 37.3 | 53.0 | 36.3 | 33.0 | 42.6 | 20.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.6 | 13.7 | 0.1 | 5.3 | 193.3 | 2.7 | 6.1 | 3.3 | 1.2 | 6.6 | 0.2 | |
| Delay (s) | 49.1 | 54.3 | 33.4 | 49.4 | 235.7 | 40.0 | 59.1 | 39.6 | 34.2 | 49.3 | 20.7 | |
| Level of Service | D | D | C | D | F | D | E | D | C | D | C | |
| Approach Delay (s) | | 50.0 | | | 146.1 | | | 38.4 | | | 30.3 | |
| Approach LOS | | D | | | F | | | D | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 75.7 | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 0.89 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 111.0 | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 77.3% | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|-------|------|------|------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 39 | 705 | 30 | 758 | 1045 | 237 | 75 | 216 | 601 | 164 | 150 | 34 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 4.0 | 4.0 | 5.5 | 5.5 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4626 | | 3255 | 3140 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4626 | | 3255 | 3140 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| 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) | 42 | 766 | 33 | 824 | 1136 | 258 | 82 | 235 | 653 | 178 | 163 | 37 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| Lane Group Flow (vph) | 42 | 795 | 0 | 824 | 1377 | 0 | 82 | 235 | 653 | 178 | 163 | 8 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 6.9 | 22.0 | | 33.0 | 48.1 | | 13.0 | 25.0 | 58.0 | 11.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 6.9 | 22.0 | | 33.0 | 48.1 | | 13.0 | 25.0 | 58.0 | 11.0 | 23.0 | 23.0 |
| Actuated g/C Ratio | 0.06 | 0.20 | | 0.30 | 0.44 | | 0.12 | 0.23 | 0.53 | 0.10 | 0.21 | 0.21 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 97 | 925 | | 976 | 1373 | | 198 | 762 | 1426 | 325 | 677 | 307 |
| v/s Ratio Prot | 0.03 | c0.17 | | 0.25 | c0.44 | | 0.05 | 0.07 | c0.24 | c0.05 | 0.05 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 |
| v/c Ratio | 0.43 | 0.86 | | 0.84 | 1.00 | | 0.41 | 0.31 | 0.46 | 0.55 | 0.24 | 0.03 |
| Uniform Delay, d1 | 49.7 | 42.5 | | 36.1 | 30.9 | | 45.0 | 35.3 | 16.2 | 47.1 | 36.2 | 34.6 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.97 | 0.92 | 1.12 | 0.95 | 0.86 | 1.00 |
| Incremental Delay, d2 | 4.2 | 10.2 | | 8.9 | 24.9 | | 6.2 | 0.3 | 0.3 | 6.0 | 0.2 | 0.0 |
| Delay (s) | 53.8 | 52.7 | | 45.0 | 55.9 | | 49.8 | 32.6 | 18.4 | 50.8 | 31.3 | 34.6 |
| Level of Service | D | D | | D | E | | D | C | B | D | C | C |
| Approach Delay (s) | | 52.8 | | | 51.8 | | | 24.5 | | | 40.8 | |
| Approach LOS | | D | | | D | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 45.1 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.80 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 81.2% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Baseline + Project AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↙ | ↑↑ | | ↗ |
| Volume (veh/h) | 1470 | 0 | 0 | 1778 | 0 | 20 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1598 | 0 | 0 | 1933 | 0 | 22 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | 450 | | |
| pX, platoon unblocked | | | | 0.88 | 0.82 | 0.88 |
| vC, conflicting volume | 1598 | | | 2564 | 399 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1015 | | | 1405 | 0 | |
| tC, single (s) | 4.1 | | | 6.8 | 6.9 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | 3.5 | 3.3 | |
| p0 queue free % | 100 | | | 100 | 98 | |
| cM capacity (veh/h) | 599 | | | 107 | 958 | |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | |
|------------------------|------|------|------|------|------|------|------|------|-----|
| Volume Total | 457 | 457 | 457 | 228 | 0 | 966 | 966 | 22 | |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 958 | |
| Volume to Capacity | 0.27 | 0.27 | 0.27 | 0.13 | 0.00 | 0.57 | 0.57 | 0.02 | |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.8 | |
| Lane LOS | A | | | | | | | | |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | | 8.8 |
| Approach LOS | A | | | | | | | | |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 52.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|-------|------|------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 972 | 599 | 396 | 1303 | 0 | 0 | 0 | 458 | 0 | 0 | 475 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1057 | 651 | 430 | 1416 | 0 | 0 | 0 | 498 | 0 | 0 | 516 | |
| RTOR Reduction (vph) | 0 | 0 | 379 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 98 | |
| Lane Group Flow (vph) | 0 | 1057 | 272 | 430 | 1416 | 0 | 0 | 0 | 498 | 0 | 0 | 418 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 30.6 | 30.6 | 13.0 | 50.6 | | | | 16.2 | | | 16.2 | |
| Effective Green, g (s) | | 30.6 | 30.6 | 13.0 | 50.6 | | | | 16.2 | | | 16.2 | |
| Actuated g/C Ratio | | 0.42 | 0.42 | 0.18 | 0.69 | | | | 0.22 | | | 0.22 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 1400 | 1102 | 557 | 2316 | | | | | 644 | | | 615 | |
| v/s Ratio Prot | | c0.32 | | c0.14 | 0.42 | | | | c0.17 | | | 0.15 | |
| v/s Ratio Perm | | | 0.10 | | | | | | | | | | |
| v/c Ratio | | 0.76 | 0.25 | 0.77 | 0.61 | | | | 0.77 | | | 0.68 | |
| Uniform Delay, d1 | | 18.2 | 13.9 | 28.7 | 6.1 | | | | 26.8 | | | 26.2 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 2.4 | 0.1 | 6.6 | 0.5 | | | | 5.8 | | | 3.0 | |
| Delay (s) | | 20.5 | 14.0 | 35.3 | 6.6 | | | | 32.6 | | | 29.2 | |
| Level of Service | | C | B | D | A | | | | C | | | C | |
| Approach Delay (s) | | 18.0 | | | 13.3 | | | 32.6 | | | 29.2 | | |
| Approach LOS | | B | | | B | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 18.9 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.76 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 73.3 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 59.7% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

Baseline + Project AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 578 | 0 | 794 | 426 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 628 | 0 | 863 | 463 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 95 | 0 | 0 |
| Lane Group Flow (vph) | 628 | 0 | 863 | 368 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 23.8 | | 20.9 | 20.9 | | |
| Effective Green, g (s) | 23.8 | | 20.9 | 20.9 | | |
| Actuated g/C Ratio | 0.44 | | 0.39 | 0.39 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 717 | | 1305 | 595 | | |
| v/s Ratio Prot | c0.39 | | c0.26 | | | |
| v/s Ratio Perm | | | | 0.24 | | |
| v/c Ratio | 0.88 | | 0.66 | 0.62 | | |
| Uniform Delay, d1 | 13.6 | | 13.5 | 13.2 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 11.6 | | 1.3 | 1.9 | | |
| Delay (s) | 25.2 | | 14.8 | 15.1 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 25.2 | 14.9 | | 0.0 | |
| Approach LOS | | C | B | | A | |

| Intersection Summary | | | |
|-----------------------------------|--|-------|-----------------------------|
| HCM 2000 Control Delay | | 18.2 | HCM 2000 Level of Service B |
| HCM 2000 Volume to Capacity ratio | | 0.77 | |
| Actuated Cycle Length (s) | | 53.7 | Sum of lost time (s) 9.0 |
| Intersection Capacity Utilization | | 65.9% | ICU Level of Service C |
| Analysis Period (min) | | 15 | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

Baseline + Project AM


























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 115 | 773 | 404 | 127 | 882 | 30 | 199 | 35 | 72 | 18 | 85 | 109 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4628 | | 1539 | 1565 | 1513 | | 1750 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4628 | | 1539 | 1565 | 1513 | | 1750 | 1489 |
| 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) | 125 | 840 | 439 | 138 | 959 | 33 | 216 | 38 | 78 | 20 | 92 | 118 |
| RTOR Reduction (vph) | 0 | 0 | 268 | 0 | 3 | 0 | 0 | 0 | 65 | 0 | 0 | 106 |
| Lane Group Flow (vph) | 125 | 840 | 171 | 138 | 989 | 0 | 125 | 129 | 13 | 0 | 112 | 12 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 12.3 | 37.0 | 37.0 | 12.8 | 37.5 | | 16.1 | 16.1 | 16.1 | | 9.9 | 9.9 |
| Effective Green, g (s) | 12.3 | 37.0 | 37.0 | 12.8 | 37.5 | | 16.1 | 16.1 | 16.1 | | 9.9 | 9.9 |
| Actuated g/C Ratio | 0.13 | 0.39 | 0.39 | 0.13 | 0.39 | | 0.17 | 0.17 | 0.17 | | 0.10 | 0.10 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 209 | 1813 | 596 | 226 | 1826 | | 260 | 265 | 256 | | 182 | 155 |
| v/s Ratio Prot | 0.08 | 0.18 | | c0.08 | c0.21 | | 0.08 | c0.08 | | | c0.06 | 0.01 |
| v/s Ratio Perm | | | 0.11 | | | | | | 0.01 | | | |
| v/c Ratio | 0.60 | 0.46 | 0.29 | 0.61 | 0.54 | | 0.48 | 0.49 | 0.05 | | 0.62 | 0.08 |
| Uniform Delay, d1 | 39.0 | 21.6 | 19.9 | 38.8 | 22.1 | | 35.7 | 35.7 | 33.1 | | 40.7 | 38.4 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.99 | 0.69 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 5.3 | 0.9 | 1.2 | 5.0 | 1.1 | | 1.9 | 1.9 | 0.1 | | 6.9 | 0.3 |
| Delay (s) | 44.3 | 22.5 | 21.1 | 43.4 | 16.4 | | 37.6 | 37.6 | 33.2 | | 47.6 | 38.7 |
| Level of Service | D | C | C | D | B | | D | D | C | | D | D |
| Approach Delay (s) | | 24.0 | | | 19.7 | | | 36.6 | | | 43.1 | |
| Approach LOS | | C | | | B | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 25.2 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.55 | C |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 54.0% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

Baseline + Project AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  | |  |  |  |  |  |  |
| Volume (vph) | 54 | 550 | 131 | 169 | 740 | 14 | 166 | 165 | 210 | 20 | 162 | 43 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3279 | | 3143 | 1705 | 1660 | 3204 | 3124 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3279 | | 3143 | 1705 | 1660 | 3204 | 3124 | |
| 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) | 59 | 598 | 142 | 184 | 804 | 15 | 180 | 179 | 228 | 22 | 176 | 47 |
| RTOR Reduction (vph) | 0 | 0 | 91 | 0 | 1 | 0 | 0 | 0 | 172 | 0 | 28 | 0 |
| Lane Group Flow (vph) | 59 | 598 | 51 | 184 | 818 | 0 | 180 | 179 | 56 | 22 | 195 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 7.0 | 34.4 | 34.4 | 16.1 | 43.5 | | 11.3 | 23.4 | 23.4 | 3.1 | 15.6 | |
| Effective Green, g (s) | 7.0 | 34.4 | 34.4 | 16.1 | 43.5 | | 11.3 | 23.4 | 23.4 | 3.1 | 15.6 | |
| Actuated g/C Ratio | 0.07 | 0.36 | 0.36 | 0.17 | 0.46 | | 0.12 | 0.25 | 0.25 | 0.03 | 0.16 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 119 | 1196 | 543 | 279 | 1501 | | 373 | 419 | 408 | 104 | 512 | |
| v/s Ratio Prot | 0.04 | 0.18 | | c0.11 | c0.25 | | c0.06 | c0.10 | | 0.01 | 0.06 | |
| v/s Ratio Perm | | | 0.03 | | | | | | 0.03 | | | |
| v/c Ratio | 0.50 | 0.50 | 0.09 | 0.66 | 0.54 | | 0.48 | 0.43 | 0.14 | 0.21 | 0.38 | |
| Uniform Delay, d1 | 42.3 | 23.6 | 20.0 | 36.9 | 18.6 | | 39.1 | 30.2 | 27.9 | 44.8 | 35.4 | |
| Progression Factor | 0.77 | 0.86 | 2.61 | 1.22 | 0.62 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.1 | 1.4 | 0.3 | 0.6 | 0.1 | | 1.3 | 1.0 | 0.2 | 1.4 | 0.6 | |
| Delay (s) | 33.5 | 21.7 | 52.6 | 45.5 | 11.6 | | 40.5 | 31.1 | 28.1 | 46.1 | 36.0 | |
| Level of Service | C | C | D | D | B | | D | C | C | D | D | |
| Approach Delay (s) | | 28.1 | | | 17.8 | | | 32.8 | | | 36.9 | |
| Approach LOS | | C | | | B | | | C | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 26.1 | | | | HCM 2000 Level of Service | | | C | | |
| HCM 2000 Volume to Capacity ratio | | | 0.57 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | | | | Sum of lost time (s) | | | 18.0 | | |
| Intersection Capacity Utilization | | | 52.2% | | | | ICU Level of Service | | | A | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: San Leandro Blvd & Marina Blvd

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 251 | 202 | 312 | 4 | 294 | 29 | 436 | 833 | 7 | 39 | 444 | 202 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1737 | 1480 | 1652 | 3534 | | 1652 | 3130 | |
| Flt Permitted | 0.19 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 333 | 1739 | 1770 | | 1732 | 1480 | 1652 | 3534 | | 1652 | 3130 | |
| 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) | 273 | 220 | 339 | 4 | 320 | 32 | 474 | 905 | 8 | 42 | 483 | 220 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 1 | 0 | 0 | 55 | 0 |
| Lane Group Flow (vph) | 273 | 220 | 339 | 0 | 324 | 7 | 474 | 912 | 0 | 42 | 648 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 38.7 | 38.7 | 95.0 | | 20.7 | 20.7 | 22.3 | 36.3 | | 5.5 | 19.0 | |
| Effective Green, g (s) | 38.7 | 38.7 | 95.0 | | 20.7 | 20.7 | 22.3 | 36.3 | | 5.5 | 19.0 | |
| Actuated g/C Ratio | 0.41 | 0.41 | 1.00 | | 0.22 | 0.22 | 0.23 | 0.38 | | 0.06 | 0.20 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 330 | 708 | 1770 | | 377 | 322 | 387 | 1350 | | 95 | 626 | |
| v/s Ratio Prot | c0.12 | 0.13 | | | | | c0.29 | 0.26 | | 0.03 | c0.21 | |
| v/s Ratio Perm | c0.21 | | 0.19 | | 0.19 | 0.00 | | | | | | |
| v/c Ratio | 0.83 | 0.31 | 0.19 | | 0.86 | 0.02 | 1.22 | 0.68 | | 0.44 | 1.03 | |
| Uniform Delay, d1 | 21.9 | 19.1 | 0.0 | | 35.7 | 29.2 | 36.4 | 24.4 | | 43.3 | 38.0 | |
| Progression Factor | 0.84 | 0.74 | 1.00 | | 1.00 | 1.00 | 1.11 | 0.72 | | 0.87 | 0.87 | |
| Incremental Delay, d2 | 14.4 | 0.3 | 0.2 | | 18.0 | 0.0 | 121.4 | 2.6 | | 3.1 | 44.4 | |
| Delay (s) | 32.8 | 14.5 | 0.2 | | 53.7 | 29.2 | 161.9 | 20.2 | | 40.9 | 77.6 | |
| Level of Service | C | B | A | | D | C | F | C | | D | E | |
| Approach Delay (s) | | 14.7 | | | 51.5 | | | 68.6 | | | 75.5 | |
| Approach LOS | | B | | | D | | | E | | | E | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 54.8 | HCM 2000 Level of Service D |
| HCM 2000 Volume to Capacity ratio | 1.02 | |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) 19.0 |
| Intersection Capacity Utilization | 90.5% | ICU Level of Service E |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

Baseline + Project AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 113 | 49 | 131 | 70 | 114 | 496 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 123 | 53 | 142 | 76 | 124 | 539 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 176 | 218 | 663 | | | |
| Volume Left (vph) | 123 | 142 | 0 | | | |
| Volume Right (vph) | 53 | 0 | 539 | | | |
| Hadj (s) | -0.01 | 0.16 | -0.45 | | | |
| Departure Headway (s) | 5.9 | 5.4 | 4.3 | | | |
| Degree Utilization, x | 0.29 | 0.33 | 0.79 | | | |
| Capacity (veh/h) | 567 | 636 | 820 | | | |
| Control Delay (s) | 11.2 | 11.0 | 21.7 | | | |
| Approach Delay (s) | 11.2 | 11.0 | 21.7 | | | |
| Approach LOS | B | B | C | | | |
| Intersection Summary | | | | | | |
| Delay | | | 17.8 | | | |
| Level of Service | | | C | | | |
| Intersection Capacity Utilization | | | 66.8% | ICU Level of Service | C | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

Baseline + Project AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 26 | 8 | 21 | 170 | 143 | 17 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 28 | 9 | 23 | 185 | 155 | 18 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 37 | 208 | 174 | | | |
| Volume Left (vph) | 28 | 23 | 0 | | | |
| Volume Right (vph) | 9 | 0 | 18 | | | |
| Hadj (s) | 0.05 | 0.06 | -0.03 | | | |
| Departure Headway (s) | 4.8 | 4.2 | 4.2 | | | |
| Degree Utilization, x | 0.05 | 0.24 | 0.20 | | | |
| Capacity (veh/h) | 691 | 833 | 847 | | | |
| Control Delay (s) | 8.0 | 8.6 | 8.2 | | | |
| Approach Delay (s) | 8.0 | 8.6 | 8.2 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.4 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 32.0% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive



















Baseline + Project AM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|-------|-------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 73 | 141 | 76 | 49 | 55 | 95 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 79 | 153 | 83 | 53 | 60 | 103 |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 233 | 136 | 163 | | | |
| Volume Left (vph) | 79 | 0 | 60 | | | |
| Volume Right (vph) | 153 | 53 | 0 | | | |
| Hadj (s) | -0.29 | -0.20 | 0.11 | | | |
| Departure Headway (s) | 4.3 | 4.4 | 4.7 | | | |
| Degree Utilization, x | 0.28 | 0.17 | 0.21 | | | |
| Capacity (veh/h) | 784 | 763 | 720 | | | |
| Control Delay (s) | 9.0 | 8.3 | 9.0 | | | |
| Approach Delay (s) | 9.0 | 8.3 | 9.0 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.8 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 37.7% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Baseline + Project AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 13 | 206 | 13 | 14 | 198 | 34 | 20 | 62 | 46 | 30 | 17 | 9 |
| 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 |
| Hourly flow rate (vph) | 14 | 224 | 14 | 15 | 215 | 37 | 22 | 67 | 50 | 33 | 18 | 10 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 14 | 238 | 267 | 139 | 61 | | | | | | | |
| Volume Left (vph) | 14 | 0 | 15 | 22 | 33 | | | | | | | |
| Volume Right (vph) | 0 | 14 | 37 | 50 | 10 | | | | | | | |
| Hadj (s) | 0.53 | -0.01 | -0.04 | -0.15 | 0.04 | | | | | | | |
| Departure Headway (s) | 5.9 | 5.3 | 4.9 | 5.1 | 5.5 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.35 | 0.36 | 0.20 | 0.09 | | | | | | | |
| Capacity (veh/h) | 592 | 650 | 706 | 635 | 581 | | | | | | | |
| Control Delay (s) | 7.8 | 9.9 | 10.6 | 9.4 | 9.0 | | | | | | | |
| Approach Delay (s) | 9.8 | | 10.6 | 9.4 | 9.0 | | | | | | | |
| Approach LOS | A | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.0 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 39.0% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
23: Doolittle Dr & Fairway Drive/Fairway Dr

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 96 | 130 | 58 | 29 | 127 | 161 | 97 | 526 | 54 | 118 | 233 | 37 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1697 | 1260 | 1620 | 1739 | 1318 | 1711 | 3028 | | 1620 | 3012 | |
| Flt Permitted | | 0.80 | 1.00 | 0.56 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1385 | 1260 | 948 | 1739 | 1318 | 1711 | 3028 | | 1620 | 3012 | |
| 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) | 104 | 141 | 63 | 32 | 138 | 175 | 105 | 572 | 59 | 128 | 253 | 40 |
| RTOR Reduction (vph) | 0 | 0 | 45 | 0 | 0 | 125 | 0 | 11 | 0 | 0 | 17 | 0 |
| Lane Group Flow (vph) | 0 | 245 | 18 | 32 | 138 | 50 | 105 | 620 | 0 | 128 | 276 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 16.1 | 16.1 | 16.1 | 16.1 | 16.1 | 7.3 | 17.2 | | 8.1 | 18.0 | |
| Effective Green, g (s) | | 16.1 | 16.1 | 16.1 | 16.1 | 16.1 | 7.3 | 17.2 | | 8.1 | 18.0 | |
| Actuated g/C Ratio | | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.13 | 0.30 | | 0.14 | 0.32 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 395 | 359 | 270 | 496 | 376 | 221 | 923 | | 232 | 961 | |
| v/s Ratio Prot | | | | | 0.08 | | 0.06 | c0.20 | | c0.08 | 0.09 | |
| v/s Ratio Perm | | c0.18 | 0.01 | 0.03 | | 0.04 | | | | | | |
| v/c Ratio | | 0.62 | 0.05 | 0.12 | 0.28 | 0.13 | 0.48 | 0.67 | | 0.55 | 0.29 | |
| Uniform Delay, d1 | | 17.5 | 14.6 | 14.9 | 15.6 | 15.0 | 22.8 | 17.1 | | 22.5 | 14.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 3.0 | 0.1 | 0.2 | 0.3 | 0.2 | 1.6 | 2.1 | | 2.8 | 0.2 | |
| Delay (s) | | 20.5 | 14.7 | 15.1 | 15.9 | 15.1 | 24.4 | 19.2 | | 25.3 | 14.6 | |
| Level of Service | | C | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 19.3 | | | 15.5 | | | 20.0 | | | 17.9 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 18.5 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.63 | B |
| Actuated Cycle Length (s) | 56.4 | Sum of lost time (s) |
| Intersection Capacity Utilization | 64.0% | 15.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | B |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 140 | 155 | 56 | 127 | 195 | 52 | 100 | 600 | 123 | 30 | 368 | 65 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3144 | | 1593 | 3150 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3144 | | 1593 | 3150 | |
| 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) | 152 | 168 | 61 | 138 | 212 | 57 | 109 | 652 | 134 | 33 | 400 | 71 |
| RTOR Reduction (vph) | 0 | 0 | 49 | 0 | 0 | 46 | 0 | 14 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 152 | 168 | 12 | 138 | 212 | 11 | 109 | 772 | 0 | 33 | 458 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 15.4 | 22.0 | 22.0 | 15.4 | 22.0 | 22.0 | 12.0 | 47.6 | | 6.0 | 41.6 | |
| Effective Green, g (s) | 15.4 | 22.0 | 22.0 | 15.4 | 22.0 | 22.0 | 12.0 | 47.6 | | 6.0 | 41.6 | |
| Actuated g/C Ratio | 0.14 | 0.20 | 0.20 | 0.14 | 0.20 | 0.20 | 0.11 | 0.43 | | 0.05 | 0.38 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 220 | 369 | 261 | 223 | 372 | 270 | 180 | 1360 | | 86 | 1191 | |
| v/s Ratio Prot | c0.10 | 0.09 | | 0.09 | c0.11 | | 0.07 | c0.25 | | 0.02 | c0.15 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.69 | 0.46 | 0.05 | 0.62 | 0.57 | 0.04 | 0.61 | 0.57 | | 0.38 | 0.38 | |
| Uniform Delay, d1 | 45.0 | 38.7 | 35.5 | 44.5 | 39.7 | 35.5 | 46.7 | 23.5 | | 50.2 | 24.9 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.06 | 0.94 | | 1.07 | 0.98 | |
| Incremental Delay, d2 | 9.7 | 1.2 | 0.1 | 5.8 | 2.4 | 0.1 | 6.3 | 1.7 | | 3.8 | 0.9 | |
| Delay (s) | 54.7 | 39.9 | 35.6 | 50.3 | 42.2 | 35.6 | 56.0 | 23.7 | | 57.4 | 25.3 | |
| Level of Service | D | D | D | D | D | D | E | C | | E | C | |
| Approach Delay (s) | | 45.1 | | | 44.0 | | | 27.6 | | | 27.4 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 33.7 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.59 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 65.9% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|--------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 35 | 231 | 7 | 6 | 372 | 203 | 2 | 0 | 0 | 38 | 0 | 30 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.95 | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 1854 | | | 3352 | | | 1770 | | | 1703 | |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.91 | | | 0.83 | |
| Satd. Flow (perm) | 1770 | 1854 | | | 3193 | | | 1699 | | | 1447 | |
| 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) | 38 | 251 | 8 | 7 | 404 | 221 | 2 | 0 | 0 | 41 | 0 | 33 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 87 | 0 | 0 | 0 | 0 | 0 | 65 | 0 |
| Lane Group Flow (vph) | 38 | 258 | 0 | 0 | 545 | 0 | 0 | 2 | 0 | 0 | 9 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 1.0 | 35.1 | | | 29.2 | | | 5.9 | | | 5.9 | |
| Effective Green, g (s) | 1.0 | 35.1 | | | 29.2 | | | 5.9 | | | 5.9 | |
| Actuated g/C Ratio | 0.02 | 0.70 | | | 0.59 | | | 0.12 | | | 0.12 | |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Grp Cap (vph) | 35 | 1304 | | | 1868 | | | 200 | | | 171 | |
| v/s Ratio Prot | c0.02 | 0.14 | | | | | | | | | | |
| v/s Ratio Perm | | | | | c0.17 | | | 0.00 | | | c0.01 | |
| v/c Ratio | 1.09 | 0.20 | | | 1.05dr | | | 0.01 | | | 0.05 | |
| Uniform Delay, d1 | 24.4 | 2.6 | | | 5.2 | | | 19.4 | | | 19.5 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 179.0 | 0.1 | | | 0.1 | | | 0.0 | | | 0.2 | |
| Delay (s) | 203.4 | 2.7 | | | 5.3 | | | 19.4 | | | 19.7 | |
| Level of Service | F | A | | | A | | | B | | | B | |
| Approach Delay (s) | | 28.3 | | | 5.3 | | | 19.4 | | | 19.7 | |
| Approach LOS | | C | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 13.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.27 | | |
| Actuated Cycle Length (s) | 49.9 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 40.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

26: Miller St & Fairway Dr/Aladdin Ave

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | |
| Volume (vph) | 23 | 326 | 31 | 72 | 623 | 187 | 12 | 0 | 12 | 37 | 2 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 0.85 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1835 | | 1593 | 1918 | | 1711 | 1531 | | 1770 | 1606 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1835 | | 1593 | 1918 | | 1801 | 1531 | | 1770 | 1606 | |
| 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) | 25 | 354 | 34 | 78 | 677 | 203 | 13 | 0 | 13 | 40 | 2 | 23 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 12 | 0 | 0 | 20 | 0 |
| Lane Group Flow (vph) | 25 | 386 | 0 | 78 | 874 | 0 | 13 | 1 | 0 | 40 | 5 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 2.1 | 40.8 | | 5.5 | 44.2 | | 3.4 | 3.4 | | 2.4 | 9.8 | |
| Effective Green, g (s) | 2.1 | 40.8 | | 5.5 | 44.2 | | 3.4 | 3.4 | | 2.4 | 9.8 | |
| Actuated g/C Ratio | 0.03 | 0.58 | | 0.08 | 0.63 | | 0.05 | 0.05 | | 0.03 | 0.14 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 53 | 1071 | | 125 | 1212 | | 87 | 74 | | 60 | 225 | |
| v/s Ratio Prot | 0.01 | 0.21 | | c0.05 | c0.46 | | | 0.00 | | c0.02 | 0.00 | |
| v/s Ratio Perm | | | | | | | c0.01 | | | | | |
| v/c Ratio | 0.47 | 0.36 | | 0.62 | 0.72 | | 0.15 | 0.01 | | 0.67 | 0.02 | |
| Uniform Delay, d1 | 33.4 | 7.7 | | 31.2 | 8.7 | | 31.9 | 31.6 | | 33.4 | 25.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.4 | 0.3 | | 6.8 | 2.3 | | 1.1 | 0.1 | | 19.5 | 0.1 | |
| Delay (s) | 35.8 | 8.0 | | 38.0 | 11.0 | | 33.0 | 31.7 | | 52.9 | 26.0 | |
| Level of Service | D | A | | D | B | | C | C | | D | C | |
| Approach Delay (s) | | 9.6 | | | 13.2 | | | 32.3 | | | 42.5 | |
| Approach LOS | | A | | | B | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 13.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.71 | | |
| Actuated Cycle Length (s) | 69.9 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 67.7% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

27: Teagarden St & Aladdin Ave

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 41 | 214 | 56 | 10 | 537 | 40 | 67 | 111 | 11 | 75 | 152 | 193 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1959 | | 1711 | 1702 | | 1652 | 1833 | | 1645 | 1740 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.34 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1959 | | 1711 | 1702 | | 584 | 1833 | | 1163 | 1740 | |
| 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) | 45 | 233 | 61 | 11 | 584 | 43 | 73 | 121 | 12 | 82 | 165 | 210 |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 3 | 0 | 0 | 5 | 0 | 0 | 66 | 0 |
| Lane Group Flow (vph) | 45 | 282 | 0 | 11 | 624 | 0 | 73 | 128 | 0 | 82 | 309 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 14 | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 3.1 | 25.8 | | 1.2 | 23.9 | | 16.0 | 16.0 | | 16.0 | 16.0 | |
| Effective Green, g (s) | 3.1 | 25.8 | | 1.2 | 23.9 | | 16.0 | 16.0 | | 16.0 | 16.0 | |
| Actuated g/C Ratio | 0.06 | 0.46 | | 0.02 | 0.43 | | 0.29 | 0.29 | | 0.29 | 0.29 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 94 | 902 | | 36 | 726 | | 166 | 523 | | 332 | 497 | |
| v/s Ratio Prot | c0.03 | 0.14 | | 0.01 | c0.37 | | | 0.07 | | | c0.18 | |
| v/s Ratio Perm | | | | | | | 0.13 | | | 0.07 | | |
| v/c Ratio | 0.48 | 0.31 | | 0.31 | 0.86 | | 0.44 | 0.24 | | 0.25 | 0.62 | |
| Uniform Delay, d1 | 25.7 | 9.5 | | 27.0 | 14.5 | | 16.3 | 15.4 | | 15.4 | 17.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.2 | 0.3 | | 6.5 | 10.3 | | 2.5 | 0.3 | | 0.5 | 2.7 | |
| Delay (s) | 30.8 | 9.8 | | 33.5 | 24.8 | | 18.9 | 15.7 | | 15.9 | 20.1 | |
| Level of Service | C | A | | C | C | | B | B | | B | C | |
| Approach Delay (s) | | 12.6 | | | 24.9 | | | 16.8 | | | 19.4 | |
| Approach LOS | | B | | | C | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.74 | | |
| Actuated Cycle Length (s) | 56.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 70.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

Baseline + Project AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 179 | 17 | 53 | 2 | 12 | 10 | 430 | 434 | 15 | 7 | 186 | 177 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.89 | | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1565 | | 1652 | 1596 | | 1652 | 1705 | 1450 | 1711 | 3140 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1565 | | 1652 | 1596 | | 1652 | 1705 | 1450 | 1711 | 3140 | |
| 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) | 195 | 18 | 58 | 2 | 13 | 11 | 467 | 472 | 16 | 8 | 202 | 192 |
| RTOR Reduction (vph) | 0 | 38 | 0 | 0 | 9 | 0 | 0 | 0 | 10 | 0 | 150 | 0 |
| Lane Group Flow (vph) | 195 | 38 | 0 | 2 | 15 | 0 | 467 | 472 | 6 | 8 | 244 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 13.8 | 27.0 | | 1.2 | 14.4 | | 15.5 | 31.3 | 31.3 | 1.3 | 17.1 | |
| Effective Green, g (s) | 13.8 | 27.0 | | 1.2 | 14.4 | | 15.5 | 31.3 | 31.3 | 1.3 | 17.1 | |
| Actuated g/C Ratio | 0.18 | 0.35 | | 0.02 | 0.19 | | 0.20 | 0.40 | 0.40 | 0.02 | 0.22 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 294 | 546 | | 25 | 297 | | 331 | 690 | 587 | 28 | 694 | |
| v/s Ratio Prot | c0.12 | c0.02 | | 0.00 | 0.01 | | c0.28 | c0.28 | | 0.00 | 0.08 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 0.66 | 0.07 | | 0.08 | 0.05 | | 1.41 | 0.68 | 0.01 | 0.29 | 0.35 | |
| Uniform Delay, d1 | 29.6 | 16.8 | | 37.5 | 25.8 | | 30.9 | 18.9 | 13.7 | 37.5 | 25.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.3 | 0.1 | | 2.9 | 0.1 | | 202.0 | 3.6 | 0.0 | 11.4 | 0.6 | |
| Delay (s) | 36.9 | 16.9 | | 40.4 | 26.0 | | 232.9 | 22.5 | 13.8 | 49.0 | 26.1 | |
| Level of Service | D | B | | D | C | | F | C | B | D | C | |
| Approach Delay (s) | | 31.3 | | | 27.1 | | | 125.3 | | | 26.5 | |
| Approach LOS | | C | | | C | | | F | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 84.3 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 0.75 | | |
| Actuated Cycle Length (s) | 77.3 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 62.1% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

Baseline + Project AM
























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↕↕ | | ↕ | ↕↕ | |
| Volume (vph) | 3 | 2 | 0 | 5 | 0 | 15 | 4 | 902 | 9 | 40 | 888 | 5 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1808 | | | 1562 | 1397 | 1649 | 4945 | | 1617 | 3468 | |
| Flt Permitted | | 0.86 | | | 0.75 | 1.00 | 0.29 | 1.00 | | 0.28 | 1.00 | |
| Satd. Flow (perm) | | 1606 | | | 1241 | 1397 | 504 | 4945 | | 472 | 3468 | |
| 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) | 3 | 2 | 0 | 5 | 0 | 16 | 4 | 980 | 10 | 43 | 965 | 5 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 5 | 0 | 0 | 5 | 1 | 4 | 990 | 0 | 43 | 970 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Effective Green, g (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | 0.06 | 0.86 | 0.86 | | 0.86 | 0.86 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 103 | | | 80 | 90 | 432 | 4239 | | 404 | 2973 | |
| v/s Ratio Prot | | | | | | | | 0.20 | | | c0.28 | |
| v/s Ratio Perm | | 0.00 | | | c0.00 | 0.00 | 0.01 | | | 0.09 | | |
| v/c Ratio | | 0.05 | | | 0.06 | 0.01 | 0.01 | 0.23 | | 0.11 | 0.33 | |
| Uniform Delay, d1 | | 48.3 | | | 48.3 | 48.2 | 1.1 | 1.4 | | 1.2 | 1.6 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.91 | 2.00 | | 0.06 | 0.06 | |
| Incremental Delay, d2 | | 0.2 | | | 0.3 | 0.1 | 0.0 | 0.1 | | 0.3 | 0.2 | |
| Delay (s) | | 48.5 | | | 48.7 | 48.2 | 2.2 | 2.9 | | 0.4 | 0.3 | |
| Level of Service | | D | | | D | D | A | A | | A | A | |
| Approach Delay (s) | | 48.5 | | | 48.3 | | | 2.9 | | | 0.3 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 2.2 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.31 | A |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 43.9% | 8.6 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Merced Street & Republic Ave

Baseline + Project AM

| |  |  |  |  |  |  |  |  |  |  |  |  | | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|----------------------|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  |  | | |
| Volume (vph) | 32 | 2 | 7 | 20 | 3 | 153 | 9 | 784 | 45 | 273 | 737 | 7 | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | | |
| Flt Protected | | 0.96 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (prot) | | 1712 | | | 1784 | 2787 | 1736 | 3471 | 1583 | 3433 | 3465 | | | |
| Flt Permitted | | 0.77 | | | 0.76 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (perm) | | 1362 | | | 1413 | 2787 | 1736 | 3471 | 1583 | 3433 | 3465 | | | |
| 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) | 35 | 2 | 8 | 22 | 3 | 166 | 10 | 852 | 49 | 297 | 801 | 8 | | |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 148 | 0 | 0 | 18 | 0 | 0 | 0 | | |
| Lane Group Flow (vph) | 0 | 38 | 0 | 0 | 25 | 18 | 10 | 852 | 31 | 297 | 809 | 0 | | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | | |
| Actuated Green, G (s) | | 12.1 | | | 12.1 | 12.1 | 1.2 | 69.6 | 69.6 | 14.8 | 83.2 | | | |
| Effective Green, g (s) | | 12.1 | | | 12.1 | 12.1 | 1.2 | 69.6 | 69.6 | 14.8 | 83.2 | | | |
| Actuated g/C Ratio | | 0.11 | | | 0.11 | 0.11 | 0.01 | 0.63 | 0.63 | 0.13 | 0.76 | | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | | 149 | | | 155 | 306 | 18 | 2196 | 1001 | 461 | 2620 | | | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.25 | | c0.09 | 0.23 | | | |
| v/s Ratio Perm | | c0.03 | | | 0.02 | 0.01 | | | 0.02 | | | | | |
| v/c Ratio | | 0.25 | | | 0.16 | 0.06 | 0.56 | 0.39 | 0.03 | 0.64 | 0.31 | | | |
| Uniform Delay, d1 | | 44.8 | | | 44.4 | 43.9 | 54.1 | 9.8 | 7.6 | 45.1 | 4.3 | | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.87 | 1.39 | 1.00 | 1.18 | 0.69 | | | |
| Incremental Delay, d2 | | 0.9 | | | 0.5 | 0.1 | 28.5 | 0.5 | 0.0 | 3.0 | 0.3 | | | |
| Delay (s) | | 45.7 | | | 44.8 | 43.9 | 75.8 | 14.1 | 7.6 | 56.2 | 3.2 | | | |
| Level of Service | | D | | | D | D | E | B | A | E | A | | | |
| Approach Delay (s) | | 45.7 | | | 44.1 | | | 14.5 | | | 17.5 | | | |
| Approach LOS | | D | | | D | | | B | | | B | | | |
| Intersection Summary | | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 19.1 | | | | | | | | | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | | | 0.41 | | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 49.7% | | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

Baseline + Project AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 14 | 4 | 30 | 812 | 478 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3190 | |
| Flt Permitted | 0.95 | 1.00 | 0.43 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 756 | 3240 | 3190 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 15 | 4 | 33 | 883 | 520 | 57 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 15 | 0 | 33 | 883 | 569 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Effective Green, g (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Actuated g/C Ratio | 0.08 | 0.08 | 0.76 | 0.76 | 0.76 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 129 | 103 | 573 | 2456 | 2418 | |
| v/s Ratio Prot | c0.01 | | | c0.27 | 0.18 | |
| v/s Ratio Perm | | 0.00 | 0.04 | | | |
| v/c Ratio | 0.12 | 0.00 | 0.06 | 0.36 | 0.24 | |
| Uniform Delay, d1 | 23.6 | 23.4 | 1.7 | 2.2 | 2.0 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.47 | |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.2 | 0.4 | 0.2 | |
| Delay (s) | 24.0 | 23.4 | 1.9 | 2.6 | 1.1 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.6 | 1.1 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 2.3 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.34 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
























c Critical Lane Group

Baseline + Project PM

HCM Signalized Intersection Capacity Analysis

Baseline + Project PM

1: Doolittle Dr & Davis St

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 44 | 82 | 22 | 169 | 72 | 455 | 14 | 539 | 244 | 612 | 846 | 20 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3081 | | 3255 | 1689 | 1493 | 1620 | 4655 | 1434 | 3143 | 3226 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3081 | | 3255 | 1689 | 1493 | 1620 | 4655 | 1434 | 3143 | 3226 | | |
| 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) | 48 | 89 | 24 | 184 | 78 | 495 | 15 | 586 | 265 | 665 | 920 | 22 | |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 165 | 0 | 0 | 157 | 0 | 1 | 0 | |
| Lane Group Flow (vph) | 48 | 92 | 0 | 184 | 78 | 330 | 15 | 586 | 108 | 665 | 941 | 0 | |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 4.3 | 9.9 | | 9.7 | 15.3 | 36.9 | 4.2 | 22.6 | 32.3 | 21.6 | 40.0 | | |
| Effective Green, g (s) | 4.3 | 9.9 | | 9.7 | 15.3 | 36.9 | 4.2 | 22.6 | 32.3 | 21.6 | 40.0 | | |
| Actuated g/C Ratio | 0.05 | 0.13 | | 0.12 | 0.19 | 0.47 | 0.05 | 0.29 | 0.41 | 0.27 | 0.51 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 91 | 385 | | 399 | 326 | 696 | 86 | 1330 | 585 | 858 | 1631 | | |
| v/s Ratio Prot | 0.03 | 0.03 | | c0.06 | 0.05 | c0.13 | 0.01 | c0.13 | 0.02 | c0.21 | c0.29 | | |
| v/s Ratio Perm | | | | | | 0.09 | | | 0.05 | | | | |
| v/c Ratio | 0.53 | 0.24 | | 0.46 | 0.24 | 0.47 | 0.17 | 0.44 | 0.18 | 0.78 | 0.58 | | |
| Uniform Delay, d1 | 36.4 | 31.2 | | 32.3 | 27.0 | 14.4 | 35.8 | 23.1 | 15.0 | 26.5 | 13.6 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 2.5 | 0.3 | | 0.3 | 0.4 | 0.2 | 0.4 | 0.3 | 0.1 | 4.0 | 0.7 | | |
| Delay (s) | 38.9 | 31.5 | | 32.6 | 27.4 | 14.6 | 36.1 | 23.4 | 15.0 | 30.5 | 14.3 | | |
| Level of Service | D | C | | C | C | B | D | C | B | C | B | | |
| Approach Delay (s) | | 33.7 | | | 20.3 | | | 21.1 | | | 21.0 | | |
| Approach LOS | | C | | | C | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.5 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.62 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 79.1 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 53.8% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
2: Phillips Ln & Davis St

Baseline + Project PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|-------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↗ | ↖ | ↗ | | ↗ | ↗ | |
| Volume (vph) | 139 | 862 | 19 | 20 | 542 | 414 | 55 | 13 | 271 | 453 | 3 | 130 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.97 | 0.85 | 1.00 | 0.86 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3168 | | 1620 | 2978 | 1318 | 1651 | 1442 | | 3143 | 1401 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.23 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3168 | | 1620 | 2978 | 1318 | 404 | 1442 | | 3143 | 1401 | |
| 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) | 151 | 937 | 21 | 22 | 589 | 450 | 60 | 14 | 295 | 492 | 3 | 141 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 16 | 135 | 0 | 191 | 0 | 0 | 107 | 0 |
| Lane Group Flow (vph) | 151 | 957 | 0 | 22 | 708 | 180 | 60 | 118 | 0 | 492 | 37 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 18 | 21 | | | | | 21 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 14.9 | 45.0 | | 4.7 | 34.8 | 59.9 | 17.2 | 17.2 | | 25.1 | 25.1 | |
| Effective Green, g (s) | 14.9 | 45.0 | | 4.7 | 34.8 | 59.9 | 17.2 | 17.2 | | 25.1 | 25.1 | |
| Actuated g/C Ratio | 0.14 | 0.43 | | 0.04 | 0.33 | 0.57 | 0.16 | 0.16 | | 0.24 | 0.24 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 229 | 1357 | | 72 | 986 | 751 | 66 | 236 | | 751 | 334 | |
| v/s Ratio Prot | c0.09 | c0.30 | | 0.01 | 0.24 | 0.06 | | 0.08 | | c0.16 | | |
| v/s Ratio Perm | | | | | | 0.08 | c0.15 | | | | | 0.03 |
| v/c Ratio | 0.66 | 0.71 | | 0.31 | 0.72 | 0.24 | 0.91 | 0.50 | | 0.66 | 0.11 | |
| Uniform Delay, d1 | 42.6 | 24.6 | | 48.6 | 30.8 | 11.2 | 43.1 | 40.0 | | 36.0 | 31.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.45 | 0.68 | 1.19 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.2 | 3.1 | | 0.8 | 3.9 | 0.1 | 77.4 | 0.6 | | 2.1 | 0.1 | |
| Delay (s) | 47.8 | 27.7 | | 71.0 | 24.7 | 13.5 | 120.5 | 40.6 | | 38.1 | 31.4 | |
| Level of Service | D | C | | E | C | B | F | D | | D | C | |
| Approach Delay (s) | | 30.4 | | | 22.3 | | | 53.6 | | | 36.6 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 31.6 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.74 | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) 13.0 |
| Intersection Capacity Utilization | 87.0% | ICU Level of Service E |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Westgate Pkwy/Warden Ave & Davis St

Baseline + Project PM















| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↘ | ↑↑↑ | | ↘↘ | ↑↑ | | | ↑ | ↘↘ | ↘ | ↑ | |
| Volume (vph) | 25 | 1322 | 205 | 345 | 834 | 97 | 135 | 25 | 421 | 64 | 22 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | | 1.00 | 0.99 | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 0.97 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4478 | | 3143 | 3253 | | | 1758 | 2805 | 1562 | 1450 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.72 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4478 | | 3143 | 3253 | | | 1326 | 2805 | 1562 | 1450 | |
| 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) | 27 | 1437 | 223 | 375 | 907 | 105 | 147 | 27 | 458 | 70 | 24 | 27 |
| RTOR Reduction (vph) | 0 | 17 | 0 | 0 | 6 | 0 | 0 | 0 | 153 | 0 | 25 | 0 |
| Lane Group Flow (vph) | 27 | 1643 | 0 | 375 | 1006 | 0 | 0 | 174 | 305 | 70 | 26 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 18 | 21 | | | | | 21 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 5.0 | 48.0 | | 16.1 | 59.6 | | | 17.8 | 33.9 | 9.6 | 9.6 | |
| Effective Green, g (s) | 5.0 | 48.0 | | 16.1 | 59.6 | | | 17.8 | 33.9 | 9.6 | 9.6 | |
| Actuated g/C Ratio | 0.05 | 0.46 | | 0.15 | 0.57 | | | 0.17 | 0.32 | 0.09 | 0.09 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 77 | 2047 | | 481 | 1846 | | | 224 | 905 | 142 | 132 | |
| v/s Ratio Prot | 0.02 | c0.37 | | c0.12 | 0.31 | | | | 0.05 | c0.04 | 0.02 | |
| v/s Ratio Perm | | | | | | | | c0.13 | 0.06 | | | |
| v/c Ratio | 0.35 | 0.80 | | 0.78 | 0.54 | | | 0.78 | 0.34 | 0.49 | 0.20 | |
| Uniform Delay, d1 | 48.4 | 24.4 | | 42.7 | 14.2 | | | 41.7 | 27.0 | 45.4 | 44.1 | |
| Progression Factor | 0.99 | 1.18 | | 1.17 | 0.99 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.8 | 2.7 | | 5.6 | 0.9 | | | 14.2 | 0.1 | 1.0 | 0.3 | |
| Delay (s) | 48.9 | 31.4 | | 55.5 | 15.0 | | | 55.9 | 27.1 | 46.4 | 44.4 | |
| Level of Service | D | C | | E | B | | | E | C | D | D | |
| Approach Delay (s) | | 31.7 | | | 25.9 | | | 35.0 | | | 45.5 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 30.6 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.76 | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) 13.5 |
| Intersection Capacity Utilization | 70.5% | ICU Level of Service C |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: I-880 SB ramps & Davis St/Davis Street

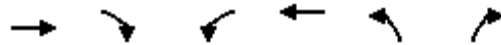
Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 1191 | 627 | 0 | 887 | 412 | 0 | 0 | 0 | 349 | 0 | 416 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.97 | | 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 | 0.85 | | 0.95 | | | | | 1.00 | 0.90 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1433 | | 3084 | | | | | 1681 | 1471 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1433 | | 3084 | | | | | 1681 | 1471 | 1461 |
| 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 | 1295 | 682 | 0 | 964 | 448 | 0 | 0 | 0 | 379 | 0 | 452 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 53 | 53 |
| Lane Group Flow (vph) | 0 | 1295 | 682 | 0 | 1372 | 0 | 0 | 0 | 0 | 288 | 223 | 214 |
| Confl. Peds. (#/hr) | | | 13 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 63.7 | 105.0 | | 63.7 | | | | | 33.3 | 33.3 | 33.3 |
| Effective Green, g (s) | | 63.7 | 105.0 | | 63.7 | | | | | 33.3 | 33.3 | 33.3 |
| Actuated g/C Ratio | | 0.61 | 1.00 | | 0.61 | | | | | 0.32 | 0.32 | 0.32 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1997 | 1433 | | 1870 | | | | | 533 | 466 | 463 |
| v/s Ratio Prot | | 0.39 | | | c0.44 | | | | | c0.17 | 0.15 | 0.15 |
| v/s Ratio Perm | | | 0.48 | | | | | | | | | |
| v/c Ratio | | 0.65 | 0.48 | | 0.73 | | | | | 0.54 | 0.48 | 0.46 |
| Uniform Delay, d1 | | 13.4 | 0.0 | | 14.6 | | | | | 29.5 | 28.9 | 28.7 |
| Progression Factor | | 0.62 | 1.00 | | 0.66 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 1.2 | 0.2 | | 2.4 | | | | | 1.1 | 0.8 | 0.7 |
| Delay (s) | | 9.5 | 0.2 | | 12.1 | | | | | 30.7 | 29.6 | 29.4 |
| Level of Service | | A | A | | B | | | | | C | C | C |
| Approach Delay (s) | | 6.3 | | | 12.1 | | | 0.0 | | | 29.9 | |
| Approach LOS | | A | | | B | | | A | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 12.9 | | HCM 2000 Level of Service | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.67 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | | | | | 8.0 | | |
| Intersection Capacity Utilization | | | 61.5% | | ICU Level of Service | | | | | B | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

Baseline + Project PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↘↘ | ↗ |
| Volume (vph) | 1082 | 461 | 0 | 883 | 407 | 541 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Frt | 0.96 | | | 1.00 | 0.94 | 0.85 |
| Flt Protected | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3381 | | | 3539 | 3309 | 1441 |
| Flt Permitted | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3381 | | | 3539 | 3309 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1176 | 501 | 0 | 960 | 442 | 588 |
| RTOR Reduction (vph) | 31 | 0 | 0 | 0 | 42 | 42 |
| Lane Group Flow (vph) | 1646 | 0 | 0 | 960 | 659 | 287 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 70.7 | | | 70.7 | 27.3 | 27.3 |
| Effective Green, g (s) | 70.7 | | | 70.7 | 27.3 | 27.3 |
| Actuated g/C Ratio | 0.67 | | | 0.67 | 0.26 | 0.26 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2276 | | | 2382 | 860 | 374 |
| v/s Ratio Prot | c0.49 | | | 0.27 | c0.20 | 0.20 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.72 | | | 0.40 | 0.77 | 0.77 |
| Uniform Delay, d1 | 10.9 | | | 7.7 | 35.9 | 35.9 |
| Progression Factor | 0.47 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.7 | | | 0.5 | 3.7 | 8.2 |
| Delay (s) | 6.8 | | | 8.2 | 39.6 | 44.1 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 6.8 | | | 8.2 | 41.1 | |
| Approach LOS | A | | | A | D | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 16.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.73 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 73.7% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
6: Doolittle Dr & Williams St

Baseline + Project PM

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|-------|------|------|------|------|-------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 52 | 82 | 22 | 100 | 72 | 83 | 16 | 595 | 69 | 166 | 963 | 52 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.99 | | |
| Flt Protected | | 0.98 | | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1529 | | | 1682 | 1304 | 1620 | 3030 | | 1562 | 3049 | | |
| Flt Permitted | | 0.84 | | | 0.71 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1302 | | | 1235 | 1304 | 1620 | 3030 | | 1562 | 3049 | | |
| 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) | 57 | 89 | 24 | 109 | 78 | 90 | 17 | 647 | 75 | 180 | 1047 | 57 | |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 69 | 0 | 11 | 0 | 0 | 4 | 0 | |
| Lane Group Flow (vph) | 0 | 163 | 0 | 0 | 187 | 21 | 17 | 711 | 0 | 180 | 1100 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 12 | | | | | 6 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 16.3 | | | 16.3 | 16.3 | 1.4 | 25.8 | | 13.9 | 37.8 | | |
| Effective Green, g (s) | | 16.3 | | | 16.3 | 16.3 | 1.4 | 25.8 | | 13.9 | 37.8 | | |
| Actuated g/C Ratio | | 0.24 | | | 0.24 | 0.24 | 0.02 | 0.37 | | 0.20 | 0.55 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 306 | | | 290 | 307 | 32 | 1129 | | 313 | 1665 | | |
| v/s Ratio Prot | | | | | | | 0.01 | 0.23 | | c0.12 | c0.36 | | |
| v/s Ratio Perm | | 0.13 | | | c0.15 | 0.02 | | | | | | | |
| v/c Ratio | | 0.53 | | | 0.64 | 0.07 | 0.53 | 0.63 | | 0.58 | 0.66 | | |
| Uniform Delay, d1 | | 23.1 | | | 23.8 | 20.6 | 33.6 | 17.8 | | 25.0 | 11.1 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 2.3 | | | 5.4 | 0.1 | 19.9 | 1.3 | | 3.0 | 1.1 | | |
| Delay (s) | | 25.4 | | | 29.2 | 20.7 | 53.5 | 19.1 | | 28.0 | 12.2 | | |
| Level of Service | | C | | | C | C | D | B | | C | B | | |
| Approach Delay (s) | | 25.4 | | | 26.5 | | | 19.9 | | | 14.5 | | |
| Approach LOS | | C | | | C | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 18.2 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.67 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 69.2 | | | | | | | | | Sum of lost time (s) | 13.7 |
| Intersection Capacity Utilization | | | 60.4% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 7: Williams St & Westgate Pkwy

Baseline + Project PM

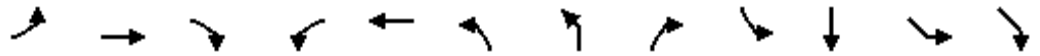


| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 50 | 412 | 227 | 245 | 252 | 54 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.96 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1565 | 1562 | 1345 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1565 | 1562 | 1345 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 54 | 448 | 247 | 266 | 274 | 59 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 107 | 0 | 36 |
| Lane Group Flow (vph) | 54 | 448 | 247 | 159 | 274 | 23 |
| Confl. Peds. (#/hr) | | | | 12 | | 6 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 7.2 | 76.9 | 65.7 | 65.7 | 24.5 | 24.5 |
| Effective Green, g (s) | 7.2 | 76.9 | 65.7 | 65.7 | 24.5 | 24.5 |
| Actuated g/C Ratio | 0.07 | 0.70 | 0.60 | 0.60 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 106 | 1277 | 1018 | 934 | 347 | 299 |
| v/s Ratio Prot | c0.03 | c0.25 | 0.14 | | c0.18 | |
| v/s Ratio Perm | | | | 0.10 | | 0.02 |
| v/c Ratio | 0.51 | 0.35 | 0.24 | 0.17 | 0.79 | 0.08 |
| Uniform Delay, d1 | 49.7 | 6.6 | 10.4 | 9.9 | 40.3 | 33.8 |
| Progression Factor | 1.00 | 1.00 | 1.42 | 3.42 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.4 | 0.8 | 0.5 | 0.4 | 11.3 | 0.1 |
| Delay (s) | 51.1 | 7.4 | 15.4 | 34.3 | 51.7 | 33.9 |
| Level of Service | D | A | B | C | D | C |
| Approach Delay (s) | | 12.1 | 25.2 | | 48.5 | |
| Approach LOS | | B | C | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 26.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.48 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 46.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis Baseline + Project PM
 8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway




















| Movement | EBL | EBT | EBR | WBL | WBT | NBL2 | NBL | NBR | SBL | SBT | SEL | SER |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|
| Lane Configurations | | ↑ | ↗ | ↖ | ↗ | | ↘ | ↖ | | ↕ | ↘ | ↖ |
| Volume (vph) | 2 | 279 | 381 | 133 | 208 | 201 | 8 | 156 | 1 | 8 | 1 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 9 | 10 | 11 | 11 | 16 | 12 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.97 | | 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 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.85 | | 1.00 | 0.88 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | 1759 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | 1757 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| 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) | 2 | 303 | 414 | 145 | 226 | 218 | 9 | 170 | 1 | 9 | 1 | 9 |
| RTOR Reduction (vph) | 0 | 0 | 220 | 0 | 0 | 0 | 0 | 127 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 305 | 194 | 145 | 226 | 0 | 227 | 43 | 0 | 10 | 10 | 0 |
| Confl. Peds. (#/hr) | | | 14 | | | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | 7 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Turn Type | Perm | NA | Perm | Prot | NA | Prot | Prot | Perm | Split | NA | Prot | |
| Protected Phases | | 2 | | 1 | 6 | 4 | 4 | | 8 | 8 | 7 | |
| Permitted Phases | 2 | | 2 | | | | | 4 | | | | |
| Actuated Green, G (s) | | 51.5 | 51.5 | 15.1 | 70.6 | | 19.0 | 19.0 | | 1.4 | 2.4 | |
| Effective Green, g (s) | | 51.5 | 51.5 | 15.1 | 70.6 | | 19.0 | 19.0 | | 1.4 | 2.4 | |
| Actuated g/C Ratio | | 0.47 | 0.47 | 0.14 | 0.64 | | 0.17 | 0.17 | | 0.01 | 0.02 | |
| Clearance Time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 822 | 675 | 214 | 1094 | | 289 | 295 | | 23 | 34 | |
| v/s Ratio Prot | | | | c0.09 | 0.13 | | c0.14 | | | c0.01 | c0.01 | |
| v/s Ratio Perm | | c0.17 | 0.13 | | | | | 0.03 | | | | |
| v/c Ratio | | 0.37 | 0.29 | 0.68 | 0.21 | | 0.79 | 0.15 | | 0.43 | 0.29 | |
| Uniform Delay, d1 | | 18.8 | 18.0 | 45.1 | 8.1 | | 43.5 | 38.6 | | 53.9 | 53.0 | |
| Progression Factor | | 0.83 | 1.17 | 1.00 | 1.00 | | 0.92 | 0.79 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.1 | 1.0 | 8.2 | 0.4 | | 12.8 | 0.2 | | 12.6 | 4.8 | |
| Delay (s) | | 16.7 | 22.1 | 53.4 | 8.6 | | 52.8 | 30.6 | | 66.5 | 57.7 | |
| Level of Service | | B | C | D | A | | D | C | | E | E | |
| Approach Delay (s) | | 19.8 | | | 26.1 | | | | | 66.5 | 57.7 | |
| Approach LOS | | B | | | C | | | | | E | E | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 28.1 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.51 | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) 20.6 |
| Intersection Capacity Utilization | 76.9% | ICU Level of Service D |
| Analysis Period (min) | 15 | |

c Critical Lane Group

















HCM Unsignalized Intersection Capacity Analysis
 9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  |  | | |  |  | | |
| Volume (veh/h) | 0 | 642 | 5 | 0 | 502 | 13 | 0 | 0 | 15 | 17 | 0 | 4 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 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 |
| Hourly flow rate (vph) | 0 | 698 | 5 | 0 | 546 | 14 | 0 | 0 | 16 | 18 | 0 | 4 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 560 | | | 703 | | | 1251 | 1260 | 701 | 1262 | 1249 | 546 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 560 | | | 703 | | | 1251 | 1260 | 701 | 1262 | 1249 | 546 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 96 | 87 | 100 | 99 |
| cM capacity (veh/h) | 1011 | | | 894 | | | 148 | 170 | 439 | 141 | 173 | 538 |
| Direction, Lane # | EB 1 | WB 1 | WB 2 | NB 1 | SB 1 | | | | | | | |
| Volume Total | 703 | 546 | 14 | 16 | 23 | | | | | | | |
| Volume Left | 0 | 0 | 0 | 0 | 18 | | | | | | | |
| Volume Right | 5 | 0 | 14 | 16 | 4 | | | | | | | |
| cSH | 1700 | 1700 | 1700 | 439 | 164 | | | | | | | |
| Volume to Capacity | 0.41 | 0.32 | 0.01 | 0.04 | 0.14 | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | 3 | 12 | | | | | | | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 13.5 | 30.4 | | | | | | | |
| Lane LOS | | | | B | D | | | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 13.5 | 30.4 | | | | | | | |
| Approach LOS | | | | B | D | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.7 | | | | | | | | | |
| Intersection Capacity Utilization | | | Err% | | ICU Level of Service | | | | H | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 46 | 612 | 19 | 45 | 444 | 48 | 18 | 43 | 29 | 26 | 40 | 35 |
| 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 |
| Hourly flow rate (vph) | 50 | 665 | 21 | 49 | 483 | 52 | 20 | 47 | 32 | 28 | 43 | 38 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 736 | 584 | 98 | 110 | | | | | | | | |
| Volume Left (vph) | 50 | 49 | 20 | 28 | | | | | | | | |
| Volume Right (vph) | 21 | 52 | 32 | 38 | | | | | | | | |
| Hadj (s) | 0.03 | 0.00 | -0.12 | -0.12 | | | | | | | | |
| Departure Headway (s) | 5.7 | 5.7 | 7.3 | 7.2 | | | | | | | | |
| Degree Utilization, x | 1.0 | 0.92 | 0.20 | 0.22 | | | | | | | | |
| Capacity (veh/h) | 628 | 630 | 469 | 470 | | | | | | | | |
| Control Delay (s) | 110.1 | 41.9 | 12.1 | 12.3 | | | | | | | | |
| Approach Delay (s) | 110.1 | 41.9 | 12.1 | 12.3 | | | | | | | | |
| Approach LOS | F | E | B | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 70.8 | | | | | | | | | |
| Level of Service | | | F | | | | | | | | | |
| Intersection Capacity Utilization | | | 59.8% | ICU Level of Service | B | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |























HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 228 | 432 | 36 | 222 | 362 | 182 | 24 | 279 | 172 | 283 | 702 | 199 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | 0.97 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1652 | 1739 | 1450 | 1620 | 1739 | 1398 | 1652 | 3240 | 1351 | 1620 | 2968 | 2968 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1652 | 1739 | 1450 | 1620 | 1739 | 1398 | 1652 | 3240 | 1351 | 1620 | 2968 | 2968 |
| 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) | 248 | 470 | 39 | 241 | 393 | 198 | 26 | 303 | 187 | 308 | 763 | 216 |
| RTOR Reduction (vph) | 0 | 0 | 30 | 0 | 0 | 137 | 0 | 0 | 154 | 0 | 18 | 0 |
| Lane Group Flow (vph) | 248 | 470 | 9 | 241 | 393 | 61 | 26 | 303 | 33 | 308 | 961 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 12 | | | | | 6 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 21.9 | 26.2 | 26.2 | 21.7 | 26.0 | 26.0 | 5.2 | 19.9 | 19.9 | 26.6 | 41.3 | |
| Effective Green, g (s) | 21.9 | 26.2 | 26.2 | 21.7 | 26.0 | 26.0 | 5.2 | 19.9 | 19.9 | 26.6 | 41.3 | |
| Actuated g/C Ratio | 0.19 | 0.23 | 0.23 | 0.19 | 0.23 | 0.23 | 0.05 | 0.18 | 0.18 | 0.24 | 0.37 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 321 | 405 | 337 | 312 | 402 | 323 | 76 | 573 | 239 | 383 | 1090 | |
| v/s Ratio Prot | c0.15 | c0.27 | | 0.15 | 0.23 | | 0.02 | 0.09 | | c0.19 | c0.32 | |
| v/s Ratio Perm | | | 0.01 | | | 0.04 | | | 0.02 | | | |
| v/c Ratio | 0.77 | 1.16 | 0.03 | 0.77 | 0.98 | 0.19 | 0.34 | 0.53 | 0.14 | 0.80 | 0.88 | |
| Uniform Delay, d1 | 42.9 | 43.1 | 33.3 | 43.0 | 42.9 | 34.7 | 51.9 | 42.0 | 39.0 | 40.4 | 33.3 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 11.6 | 96.3 | 0.0 | 11.9 | 38.7 | 0.4 | 3.6 | 1.2 | 0.4 | 12.2 | 8.8 | |
| Delay (s) | 54.5 | 139.4 | 33.3 | 54.9 | 81.6 | 35.1 | 55.6 | 43.1 | 39.4 | 52.7 | 42.1 | |
| Level of Service | D | F | C | D | F | D | E | D | D | D | D | |
| Approach Delay (s) | | 106.1 | | | 62.8 | | | 42.4 | | | 44.6 | |
| Approach LOS | | F | | | E | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 62.5 | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 0.95 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 112.4 | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 79.3% | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Merced St & Marina Blvd

Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  | |  |  |  |  |  |  |
| Volume (vph) | 58 | 945 | 72 | 553 | 691 | 134 | 110 | 207 | 991 | 323 | 218 | 41 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4598 | | 3255 | 3153 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1462 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4598 | | 3255 | 3153 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1462 |
| 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) | 63 | 1027 | 78 | 601 | 751 | 146 | 120 | 225 | 1077 | 351 | 237 | 45 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| Lane Group Flow (vph) | 63 | 1097 | 0 | 601 | 882 | 0 | 120 | 225 | 1077 | 351 | 237 | 10 |
| Confl. Peds. (#/hr) | | | 8 | | | 2 | | | | | | 7 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 9.2 | 24.0 | | 27.0 | 41.8 | | 17.0 | 25.0 | 52.0 | 15.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 9.2 | 25.5 | | 27.0 | 43.3 | | 17.0 | 26.5 | 52.0 | 15.0 | 24.5 | 24.5 |
| Actuated g/C Ratio | 0.08 | 0.23 | | 0.25 | 0.39 | | 0.15 | 0.24 | 0.47 | 0.14 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 130 | 1065 | | 798 | 1241 | | 259 | 808 | 1279 | 443 | 721 | 325 |
| v/s Ratio Prot | 0.04 | c0.24 | | 0.18 | 0.28 | | 0.07 | 0.07 | c0.40 | c0.11 | 0.07 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 |
| v/c Ratio | 0.48 | 1.03 | | 0.75 | 0.71 | | 0.46 | 0.28 | 0.84 | 0.79 | 0.33 | 0.03 |
| Uniform Delay, d1 | 48.1 | 42.2 | | 38.4 | 28.1 | | 42.3 | 34.0 | 25.4 | 46.0 | 35.9 | 33.5 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.01 | 1.01 | 0.96 | 0.98 | 1.00 | 1.00 |
| Incremental Delay, d2 | 3.8 | 35.6 | | 6.5 | 3.5 | | 5.6 | 0.2 | 5.2 | 13.3 | 0.4 | 0.1 |
| Delay (s) | 52.0 | 77.9 | | 44.9 | 31.6 | | 48.6 | 34.5 | 29.7 | 58.6 | 36.0 | 33.5 |
| Level of Service | D | E | | D | C | | D | C | C | E | D | C |
| Approach Delay (s) | | 76.5 | | | 36.9 | | | 32.1 | | | 48.4 | |
| Approach LOS | | E | | | D | | | C | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 46.8 | | | | | | | | | D |
| HCM 2000 Volume to Capacity ratio | | | 0.89 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | 17.5 |
| Intersection Capacity Utilization | | | 74.3% | | | | | | | | | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Baseline + Project PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↙ | ↑↑ | | ↗ |
| Volume (veh/h) | 2259 | 0 | 0 | 1277 | 0 | 20 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 2455 | 0 | 0 | 1388 | 0 | 22 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | 450 | | |
| pX, platoon unblocked | | | 0.82 | | 0.87 | 0.82 |
| vC, conflicting volume | | | 2455 | | 3149 | 614 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 1673 | | 2030 | 0 |
| tC, single (s) | | | 4.1 | | 6.8 | 6.9 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 100 | | 100 | 98 |
| cM capacity (veh/h) | | | 311 | | 43 | 888 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total | 702 | 702 | 702 | 351 | 0 | 694 | 694 | 22 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 888 |
| Volume to Capacity | 0.41 | 0.41 | 0.41 | 0.21 | 0.00 | 0.41 | 0.41 | 0.02 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.2 |
| Lane LOS | | | | | | | | A |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | 9.2 |
| Approach LOS | | | | | | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|-----|------------------------|
| Average Delay | | 0.1 | |
| Intersection Capacity Utilization | 42.7% | | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Baseline + Project PM

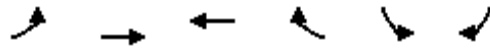


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|-------|------|------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1244 | 1065 | 408 | 812 | 0 | 0 | 0 | 445 | 0 | 0 | 465 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1352 | 1158 | 443 | 883 | 0 | 0 | 0 | 484 | 0 | 0 | 505 | |
| RTOR Reduction (vph) | 0 | 0 | 619 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 286 | |
| Lane Group Flow (vph) | 0 | 1352 | 539 | 443 | 883 | 0 | 0 | 0 | 484 | 0 | 0 | 219 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 35.0 | 35.0 | 13.2 | 55.2 | | | | 16.5 | | | 16.5 | |
| Effective Green, g (s) | | 35.0 | 35.0 | 13.2 | 55.2 | | | | 16.5 | | | 16.5 | |
| Actuated g/C Ratio | | 0.45 | 0.45 | 0.17 | 0.71 | | | | 0.21 | | | 0.21 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1501 | 1182 | 530 | 2368 | | | | 615 | | | 588 | |
| v/s Ratio Prot | | c0.40 | | c0.14 | 0.26 | | | | c0.17 | | | 0.08 | |
| v/s Ratio Perm | | | 0.20 | | | | | | | | | | |
| v/c Ratio | | 0.90 | 0.46 | 0.84 | 0.37 | | | | 0.79 | | | 0.37 | |
| Uniform Delay, d1 | | 20.0 | 15.0 | 31.5 | 4.6 | | | | 29.2 | | | 26.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 7.8 | 0.3 | 11.0 | 0.1 | | | | 6.6 | | | 0.4 | |
| Delay (s) | | 27.8 | 15.3 | 42.4 | 4.7 | | | | 35.8 | | | 26.8 | |
| Level of Service | | C | B | D | A | | | | D | | | C | |
| Approach Delay (s) | | 22.0 | | | 17.3 | | | 35.8 | | | 26.8 | | |
| Approach LOS | | C | | | B | | | D | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 22.6 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.86 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 78.2 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 57.5% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

Baseline + Project PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 728 | 0 | 711 | 502 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 791 | 0 | 773 | 546 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 99 | 0 | 0 |
| Lane Group Flow (vph) | 791 | 0 | 773 | 447 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 36.6 | | 24.1 | 24.1 | | |
| Effective Green, g (s) | 36.6 | | 24.1 | 24.1 | | |
| Actuated g/C Ratio | 0.53 | | 0.35 | 0.35 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 850 | | 1160 | 529 | | |
| v/s Ratio Prot | c0.49 | | 0.23 | | | |
| v/s Ratio Perm | | | | c0.29 | | |
| v/c Ratio | 0.93 | | 0.67 | 0.85 | | |
| Uniform Delay, d1 | 15.4 | | 19.4 | 21.1 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 16.5 | | 1.5 | 11.8 | | |
| Delay (s) | 31.9 | | 20.8 | 32.9 | | |
| Level of Service | C | | C | C | | |
| Approach Delay (s) | | 31.9 | 25.8 | | 0.0 | |
| Approach LOS | | C | C | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 28.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.90 | | |
| Actuated Cycle Length (s) | 69.7 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 78.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

Baseline + Project PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | ↘ | ↑↑↑ | ↗ | ↘ | ↑↑↑ | | ↘ | ↗ | ↗ | | ↗ | ↗ |
| Volume (vph) | 180 | 960 | 354 | 151 | 686 | 19 | 365 | 32 | 101 | 15 | 50 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1529 | 1678 | 4633 | | 1539 | 1555 | 1508 | | 1746 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1529 | 1678 | 4633 | | 1539 | 1555 | 1508 | | 1746 | 1489 |
| 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) | 196 | 1043 | 385 | 164 | 746 | 21 | 397 | 35 | 110 | 16 | 54 | 64 |
| RTOR Reduction (vph) | 0 | 0 | 243 | 0 | 3 | 0 | 0 | 0 | 87 | 0 | 0 | 59 |
| Lane Group Flow (vph) | 196 | 1043 | 142 | 164 | 764 | 0 | 214 | 218 | 23 | 0 | 70 | 5 |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 17.3 | 37.0 | 37.0 | 14.7 | 34.4 | | 21.1 | 21.1 | 21.1 | | 8.0 | 8.0 |
| Effective Green, g (s) | 17.3 | 37.0 | 37.0 | 14.7 | 34.4 | | 21.1 | 21.1 | 21.1 | | 8.0 | 8.0 |
| Actuated g/C Ratio | 0.17 | 0.37 | 0.37 | 0.15 | 0.34 | | 0.21 | 0.21 | 0.21 | | 0.08 | 0.08 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 280 | 1722 | 565 | 246 | 1593 | | 324 | 328 | 318 | | 139 | 119 |
| v/s Ratio Prot | c0.12 | c0.22 | | 0.10 | 0.16 | | 0.14 | c0.14 | | | c0.04 | 0.00 |
| v/s Ratio Perm | | | 0.09 | | | | | | 0.02 | | | |
| v/c Ratio | 0.70 | 0.61 | 0.25 | 0.67 | 0.48 | | 0.66 | 0.66 | 0.07 | | 0.50 | 0.04 |
| Uniform Delay, d1 | 38.9 | 25.6 | 21.9 | 40.3 | 25.8 | | 36.2 | 36.2 | 31.6 | | 44.1 | 42.5 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.89 | 1.22 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 8.0 | 1.6 | 1.1 | 7.1 | 1.0 | | 5.5 | 5.5 | 0.1 | | 3.9 | 0.2 |
| Delay (s) | 46.9 | 27.2 | 23.0 | 43.1 | 32.5 | | 41.6 | 41.7 | 31.7 | | 48.0 | 42.7 |
| Level of Service | D | C | C | D | C | | D | D | C | | D | D |
| Approach Delay (s) | | 28.6 | | | 34.4 | | | 39.7 | | | 45.4 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 32.8 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.65 | C |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 59.6% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | B |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 17: Alvarado St & Marina Blvd

Baseline + Project PM

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|----------------------|------|---------------------------|-------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 62 | 821 | 94 | 128 | 507 | 19 | 154 | 126 | 317 | 30 | 115 | 74 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1463 | 1652 | 3269 | | 3143 | 1705 | 1658 | 3204 | 3020 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1463 | 1652 | 3269 | | 3143 | 1705 | 1658 | 3204 | 3020 | |
| 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) | 67 | 892 | 102 | 139 | 551 | 21 | 167 | 137 | 345 | 33 | 125 | 80 |
| RTOR Reduction (vph) | 0 | 0 | 57 | 0 | 2 | 0 | 0 | 0 | 277 | 0 | 69 | 0 |
| Lane Group Flow (vph) | 67 | 892 | 45 | 139 | 570 | 0 | 167 | 137 | 68 | 33 | 136 | 0 |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 7.6 | 43.7 | 43.7 | 13.8 | 49.9 | | 11.4 | 19.7 | 19.7 | 4.8 | 13.5 | |
| Effective Green, g (s) | 7.6 | 43.7 | 43.7 | 13.8 | 49.9 | | 11.4 | 19.7 | 19.7 | 4.8 | 13.5 | |
| Actuated g/C Ratio | 0.08 | 0.44 | 0.44 | 0.14 | 0.50 | | 0.11 | 0.20 | 0.20 | 0.05 | 0.14 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 123 | 1443 | 639 | 227 | 1631 | | 358 | 335 | 326 | 153 | 407 | |
| v/s Ratio Prot | 0.04 | c0.27 | | c0.08 | 0.17 | | c0.05 | c0.08 | | 0.01 | 0.04 | |
| v/s Ratio Perm | | | 0.03 | | | | | | 0.04 | | | |
| v/c Ratio | 0.54 | 0.62 | 0.07 | 0.61 | 0.35 | | 0.47 | 0.41 | 0.21 | 0.22 | 0.33 | |
| Uniform Delay, d1 | 44.5 | 21.7 | 16.3 | 40.6 | 15.2 | | 41.5 | 35.1 | 33.6 | 45.8 | 39.2 | |
| Progression Factor | 1.47 | 0.21 | 0.00 | 1.16 | 0.78 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 1.7 | 0.2 | 2.6 | 0.3 | | 1.3 | 1.1 | 0.4 | 1.0 | 0.7 | |
| Delay (s) | 67.6 | 6.3 | 0.2 | 49.6 | 12.1 | | 42.8 | 36.2 | 34.1 | 46.8 | 39.8 | |
| Level of Service | E | A | A | D | B | | D | D | C | D | D | |
| Approach Delay (s) | | 9.6 | | | 19.5 | | | 36.7 | | | 40.8 | |
| Approach LOS | | A | | | B | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.7 | | | HCM 2000 Level of Service | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.57 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | Sum of lost time (s) | | | | | 18.0 | | | |
| Intersection Capacity Utilization | | | 57.5% | ICU Level of Service | | | B | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: San Leandro Blvd & Marina Blvd

Baseline + Project PM

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|------|-------|------|---------------------------|------|-------|------|------|------|-------|------|--|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 331 | 481 | 342 | 3 | 196 | 14 | 228 | 439 | 14 | 51 | 670 | 255 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 | |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1648 | 1739 | 1770 | | 1737 | 1480 | 1652 | 3523 | | 1652 | 3149 | | |
| Flt Permitted | 0.30 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 528 | 1739 | 1770 | | 1725 | 1480 | 1652 | 3523 | | 1652 | 3149 | | |
| 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) | 360 | 523 | 372 | 3 | 213 | 15 | 248 | 477 | 15 | 55 | 728 | 277 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 2 | 0 | 0 | 38 | 0 | |
| Lane Group Flow (vph) | 360 | 523 | 372 | 0 | 216 | 3 | 248 | 490 | 0 | 55 | 967 | 0 | |
| Confl. Peds. (#/hr) | 12 | | | | | | 12 | | | | | 6 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | | |
| Actuated Green, G (s) | 40.8 | 40.8 | 100.0 | | 17.9 | 17.9 | 18.1 | 37.4 | | 7.3 | 26.1 | | |
| Effective Green, g (s) | 40.8 | 40.8 | 100.0 | | 17.9 | 17.9 | 18.1 | 37.4 | | 7.3 | 26.1 | | |
| Actuated g/C Ratio | 0.41 | 0.41 | 1.00 | | 0.18 | 0.18 | 0.18 | 0.37 | | 0.07 | 0.26 | | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | | |
| Lane Grp Cap (vph) | 427 | 709 | 1770 | | 308 | 264 | 299 | 1317 | | 120 | 821 | | |
| v/s Ratio Prot | c0.16 | 0.30 | | | | | c0.15 | 0.14 | | 0.03 | c0.31 | | |
| v/s Ratio Perm | c0.18 | | 0.21 | | 0.13 | 0.00 | | | | | | | |
| v/c Ratio | 0.84 | 0.74 | 0.21 | | 0.70 | 0.01 | 0.83 | 0.37 | | 0.46 | 1.18 | | |
| Uniform Delay, d1 | 23.4 | 25.1 | 0.0 | | 38.5 | 33.8 | 39.5 | 22.8 | | 44.5 | 37.0 | | |
| Progression Factor | 0.70 | 0.75 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 12.0 | 3.6 | 0.2 | | 7.5 | 0.0 | 17.1 | 0.8 | | 2.8 | 92.7 | | |
| Delay (s) | 28.3 | 22.5 | 0.2 | | 46.1 | 33.8 | 56.5 | 23.6 | | 47.2 | 129.7 | | |
| Level of Service | C | C | A | | D | C | E | C | | D | F | | |
| Approach Delay (s) | | 17.6 | | | 45.3 | | | 34.6 | | | 125.4 | | |
| Approach LOS | | B | | | D | | | C | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 58.1 | | HCM 2000 Level of Service | | | | | | E | | |
| HCM 2000 Volume to Capacity ratio | | | 0.97 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | Sum of lost time (s) | | | | | | 19.0 | | |
| Intersection Capacity Utilization | | | 94.7% | | ICU Level of Service | | | | | | F | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

Baseline + Project PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 489 | 121 | 95 | 93 | 170 | 217 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 532 | 132 | 103 | 101 | 185 | 236 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 663 | 204 | 421 | | | |
| Volume Left (vph) | 532 | 103 | 0 | | | |
| Volume Right (vph) | 132 | 0 | 236 | | | |
| Hadj (s) | 0.08 | 0.14 | -0.30 | | | |
| Departure Headway (s) | 5.9 | 6.8 | 5.9 | | | |
| Degree Utilization, x | 1.0 | 0.38 | 0.69 | | | |
| Capacity (veh/h) | 607 | 521 | 598 | | | |
| Control Delay (s) | 84.0 | 13.9 | 21.3 | | | |
| Approach Delay (s) | 84.0 | 13.9 | 21.3 | | | |
| Approach LOS | F | B | C | | | |
| Intersection Summary | | | | | | |
| Delay | | | 52.4 | | | |
| Level of Service | | | F | | | |
| Intersection Capacity Utilization | | | 76.9% | ICU Level of Service | D | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

Baseline + Project PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 19 | 14 | 23 | 166 | 201 | 39 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 21 | 15 | 25 | 180 | 218 | 42 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 36 | 205 | 261 | | | |
| Volume Left (vph) | 21 | 25 | 0 | | | |
| Volume Right (vph) | 15 | 0 | 42 | | | |
| Hadj (s) | -0.11 | 0.06 | -0.06 | | | |
| Departure Headway (s) | 4.8 | 4.3 | 4.1 | | | |
| Degree Utilization, x | 0.05 | 0.25 | 0.30 | | | |
| Capacity (veh/h) | 678 | 816 | 846 | | | |
| Control Delay (s) | 8.0 | 8.7 | 8.9 | | | |
| Approach Delay (s) | 8.0 | 8.7 | 8.9 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.8 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 36.3% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Signalized Intersection Capacity Analysis

21: Monarch Bay Drive & Fairway Drive

Baseline + Project PM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Volume (vph) | 47 | 121 | 72 | 65 | 131 | 84 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Util. Factor | 1.00 | | 1.00 | | | 1.00 |
| Frt | 0.90 | | 0.94 | | | 1.00 |
| Flt Protected | 0.99 | | 1.00 | | | 0.97 |
| Satd. Flow (prot) | 1658 | | 1743 | | | 1808 |
| Flt Permitted | 0.99 | | 1.00 | | | 0.74 |
| Satd. Flow (perm) | 1658 | | 1743 | | | 1378 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 51 | 132 | 78 | 71 | 142 | 91 |
| RTOR Reduction (vph) | 79 | 0 | 43 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 104 | 0 | 106 | 0 | 0 | 233 |
| Turn Type | Prot | | NA | | Perm | NA |
| Protected Phases | 8 | | 2 | | | 6 |
| Permitted Phases | | | | | 6 | |
| Actuated Green, G (s) | 18.0 | | 18.0 | | | 18.0 |
| Effective Green, g (s) | 18.0 | | 18.0 | | | 18.0 |
| Actuated g/C Ratio | 0.40 | | 0.40 | | | 0.40 |
| Clearance Time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Grp Cap (vph) | 663 | | 697 | | | 551 |
| v/s Ratio Prot | c0.06 | | 0.06 | | | |
| v/s Ratio Perm | | | | | | c0.17 |
| v/c Ratio | 0.16 | | 0.15 | | | 0.42 |
| Uniform Delay, d1 | 8.6 | | 8.6 | | | 9.7 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.5 | | 0.5 | | | 2.4 |
| Delay (s) | 9.1 | | 9.1 | | | 12.1 |
| Level of Service | A | | A | | | B |
| Approach Delay (s) | 9.1 | | 9.1 | | | 12.1 |
| Approach LOS | A | | A | | | B |


















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 10.4 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.29 | | |
| Actuated Cycle Length (s) | 45.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 40.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 9 | 209 | 22 | 31 | 238 | 39 | 17 | 21 | 22 | 35 | 24 | 24 |
| 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 |
| Hourly flow rate (vph) | 10 | 227 | 24 | 34 | 259 | 42 | 18 | 23 | 24 | 38 | 26 | 26 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 10 | 251 | 335 | 65 | 90 | | | | | | | |
| Volume Left (vph) | 10 | 0 | 34 | 18 | 38 | | | | | | | |
| Volume Right (vph) | 0 | 24 | 42 | 24 | 26 | | | | | | | |
| Hadj (s) | 0.53 | -0.03 | -0.02 | -0.13 | -0.06 | | | | | | | |
| Departure Headway (s) | 5.8 | 5.2 | 4.8 | 5.4 | 5.4 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.36 | 0.44 | 0.10 | 0.14 | | | | | | | |
| Capacity (veh/h) | 601 | 664 | 729 | 581 | 591 | | | | | | | |
| Control Delay (s) | 7.7 | 10.0 | 11.5 | 8.9 | 9.2 | | | | | | | |
| Approach Delay (s) | 9.9 | | 11.5 | 8.9 | 9.2 | | | | | | | |
| Approach LOS | A | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.4 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 46.3% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

Baseline + Project PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 46 | 153 | 104 | 61 | 144 | 123 | 78 | 291 | 42 | 188 | 590 | 86 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.98 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1716 | 1259 | 1620 | 1739 | 1319 | 1711 | 3019 | | 1620 | 3016 | |
| Flt Permitted | | 0.89 | 1.00 | 0.59 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1546 | 1259 | 1013 | 1739 | 1319 | 1711 | 3019 | | 1620 | 3016 | |
| 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) | 50 | 166 | 113 | 66 | 157 | 134 | 85 | 316 | 46 | 204 | 641 | 93 |
| RTOR Reduction (vph) | 0 | 0 | 84 | 0 | 0 | 99 | 0 | 16 | 0 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 0 | 216 | 29 | 66 | 157 | 35 | 85 | 346 | 0 | 204 | 720 | 0 |
| Confl. Peds. (#/hr) | 12 | | | | | | 12 | | | | | 6 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | 5.1 | 16.7 | | 9.9 | 21.5 | |
| Effective Green, g (s) | | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | 5.1 | 16.7 | | 9.9 | 21.5 | |
| Actuated g/C Ratio | | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.09 | 0.30 | | 0.18 | 0.38 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 399 | 325 | 261 | 449 | 340 | 155 | 898 | | 285 | 1155 | |
| v/s Ratio Prot | | | | | 0.09 | | 0.05 | 0.11 | | c0.13 | c0.24 | |
| v/s Ratio Perm | | c0.14 | 0.02 | 0.07 | | 0.03 | | | | | | |
| v/c Ratio | | 0.54 | 0.09 | 0.25 | 0.35 | 0.10 | 0.55 | 0.39 | | 0.72 | 0.62 | |
| Uniform Delay, d1 | | 17.9 | 15.8 | 16.5 | 17.0 | 15.8 | 24.4 | 15.6 | | 21.8 | 14.0 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.5 | 0.1 | 0.5 | 0.5 | 0.1 | 3.9 | 0.4 | | 8.3 | 1.2 | |
| Delay (s) | | 19.4 | 15.9 | 17.0 | 17.4 | 16.0 | 28.3 | 16.0 | | 30.1 | 15.2 | |
| Level of Service | | B | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 18.2 | | | 16.8 | | | 18.3 | | | 18.4 | |
| Approach LOS | | B | | | B | | | B | | | B | |

























Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.1 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 56.1 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 62.9% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Merced Street & Fairway Dr

Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 164 | 220 | 120 | 147 | 177 | 44 | 75 | 394 | 88 | 62 | 556 | 93 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 | |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 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 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1593 | 1863 | 1310 | 1593 | 1863 | 1372 | 1652 | 3145 | | 1593 | 3137 | | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1593 | 1863 | 1310 | 1593 | 1863 | 1372 | 1652 | 3145 | | 1593 | 3137 | | |
| 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) | 178 | 239 | 130 | 160 | 192 | 48 | 82 | 428 | 96 | 67 | 604 | 101 | |
| RTOR Reduction (vph) | 0 | 0 | 102 | 0 | 0 | 37 | 0 | 17 | 0 | 0 | 13 | 0 | |
| Lane Group Flow (vph) | 178 | 239 | 28 | 160 | 192 | 11 | 82 | 507 | 0 | 67 | 692 | 0 | |
| Confl. Peds. (#/hr) | | | 4 | | | | | | 3 | | | 1 | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% | |
| Bus Blockages (#/hr) | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | | |
| Permitted Phases | | | 8 | | | 4 | | | | | | | |
| Actuated Green, G (s) | 17.6 | 23.3 | 23.3 | 19.0 | 24.7 | 24.7 | 7.5 | 39.5 | | 9.2 | 41.2 | | |
| Effective Green, g (s) | 17.6 | 23.3 | 23.3 | 19.0 | 24.7 | 24.7 | 7.5 | 39.5 | | 9.2 | 41.2 | | |
| Actuated g/C Ratio | 0.16 | 0.21 | 0.21 | 0.17 | 0.22 | 0.22 | 0.07 | 0.36 | | 0.08 | 0.37 | | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | | |
| Lane Grp Cap (vph) | 254 | 394 | 277 | 275 | 418 | 308 | 112 | 1129 | | 133 | 1174 | | |
| v/s Ratio Prot | c0.11 | c0.13 | | c0.10 | 0.10 | | c0.05 | 0.16 | | 0.04 | c0.22 | | |
| v/s Ratio Perm | | | 0.02 | | | 0.01 | | | | | | | |
| v/c Ratio | 0.70 | 0.61 | 0.10 | 0.58 | 0.46 | 0.03 | 0.73 | 0.45 | | 0.50 | 0.59 | | |
| Uniform Delay, d1 | 43.7 | 39.2 | 34.9 | 41.8 | 36.9 | 33.3 | 50.3 | 26.9 | | 48.2 | 27.6 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.02 | 1.01 | | 0.81 | 0.71 | | |
| Incremental Delay, d2 | 9.0 | 3.0 | 0.2 | 3.7 | 1.1 | 0.1 | 22.7 | 1.3 | | 3.9 | 2.1 | | |
| Delay (s) | 52.7 | 42.3 | 35.1 | 45.5 | 38.0 | 33.4 | 73.9 | 28.6 | | 43.0 | 21.8 | | |
| Level of Service | D | D | D | D | D | C | E | C | | D | C | | |
| Approach Delay (s) | | 44.0 | | | 40.4 | | | 34.7 | | | 23.6 | | |
| Approach LOS | | D | | | D | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 34.2 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.61 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 64.9% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

Baseline + Project PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|--------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 23 | 297 | 3 | 6 | 359 | 84 | 10 | 0 | 7 | 129 | 0 | 102 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.97 | | | 0.94 | | | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.97 | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 1860 | | | 3438 | | | 1707 | | | 1704 | |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.83 | | | 0.82 | |
| Satd. Flow (perm) | 1770 | 1860 | | | 3269 | | | 1451 | | | 1430 | |
| 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) | 25 | 323 | 3 | 7 | 390 | 91 | 11 | 0 | 8 | 140 | 0 | 111 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 14 | 0 | 0 | 81 | 0 |
| Lane Group Flow (vph) | 25 | 326 | 0 | 0 | 456 | 0 | 0 | 5 | 0 | 0 | 170 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 0.9 | 27.1 | | | 21.3 | | | 12.2 | | | 12.2 | |
| Effective Green, g (s) | 0.9 | 27.1 | | | 21.3 | | | 12.2 | | | 12.2 | |
| Actuated g/C Ratio | 0.02 | 0.56 | | | 0.44 | | | 0.25 | | | 0.25 | |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Grp Cap (vph) | 33 | 1045 | | | 1444 | | | 367 | | | 361 | |
| v/s Ratio Prot | 0.01 | c0.18 | | | | | | | | | | |
| v/s Ratio Perm | | | | | 0.14 | | | 0.00 | | | c0.12 | |
| v/c Ratio | 0.76 | 0.31 | | | 1.57dr | | | 0.01 | | | 0.47 | |
| Uniform Delay, d1 | 23.5 | 5.6 | | | 8.7 | | | 13.5 | | | 15.3 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 59.5 | 0.2 | | | 0.2 | | | 0.0 | | | 1.3 | |
| Delay (s) | 83.1 | 5.8 | | | 8.9 | | | 13.5 | | | 16.6 | |
| Level of Service | F | A | | | A | | | B | | | B | |
| Approach Delay (s) | | 11.3 | | | 8.9 | | | 13.5 | | | 16.6 | |
| Approach LOS | | B | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 11.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.41 | | |
| Actuated Cycle Length (s) | 48.2 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 42.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
26: Miller St & Fairway Dr/Aladdin Ave

Baseline + Project PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 17 | 583 | 14 | 18 | 393 | 84 | 69 | 2 | 56 | 120 | 2 | 83 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1855 | | 1593 | 1935 | | 1711 | 1539 | | 1770 | 1589 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.70 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1855 | | 1593 | 1935 | | 1256 | 1539 | | 1770 | 1589 | |
| 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) | 18 | 634 | 15 | 20 | 427 | 91 | 75 | 2 | 61 | 130 | 2 | 90 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 54 | 0 | 0 | 63 | 0 |
| Lane Group Flow (vph) | 18 | 648 | 0 | 20 | 512 | 0 | 75 | 9 | 0 | 130 | 29 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 2.2 | 38.8 | | 2.3 | 38.9 | | 9.3 | 9.3 | | 10.0 | 23.3 | |
| Effective Green, g (s) | 2.2 | 38.8 | | 2.3 | 38.9 | | 9.3 | 9.3 | | 10.0 | 23.3 | |
| Actuated g/C Ratio | 0.03 | 0.50 | | 0.03 | 0.50 | | 0.12 | 0.12 | | 0.13 | 0.30 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 49 | 920 | | 46 | 962 | | 149 | 183 | | 226 | 473 | |
| v/s Ratio Prot | 0.01 | c0.35 | | c0.01 | 0.26 | | | 0.01 | | c0.07 | 0.02 | |
| v/s Ratio Perm | | | | | | | c0.06 | | | | | |
| v/c Ratio | 0.37 | 0.70 | | 0.43 | 0.53 | | 0.50 | 0.05 | | 0.58 | 0.06 | |
| Uniform Delay, d1 | 37.3 | 15.3 | | 37.3 | 13.4 | | 32.3 | 30.5 | | 32.1 | 19.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.7 | 2.7 | | 2.4 | 0.7 | | 3.6 | 0.2 | | 2.2 | 0.1 | |
| Delay (s) | 39.0 | 17.9 | | 39.7 | 14.2 | | 35.9 | 30.7 | | 34.3 | 19.7 | |
| Level of Service | D | B | | D | B | | D | C | | C | B | |
| Approach Delay (s) | | 18.5 | | | 15.1 | | | 33.5 | | | 28.2 | |
| Approach LOS | | B | | | B | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 20.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 78.2 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 52.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

27: Teagarden St & Aladdin Ave

Baseline + Project PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 109 | 416 | 122 | 2 | 183 | 64 | 52 | 101 | 11 | 36 | 204 | 188 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.96 | | 1.00 | 0.99 | | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1952 | | 1711 | 1639 | | 1652 | 1831 | | 1643 | 1764 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.29 | 1.00 | | 0.68 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1952 | | 1711 | 1639 | | 506 | 1831 | | 1173 | 1764 | |
| 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) | 118 | 452 | 133 | 2 | 199 | 70 | 57 | 110 | 12 | 39 | 222 | 204 |
| RTOR Reduction (vph) | 0 | 14 | 0 | 0 | 18 | 0 | 0 | 6 | 0 | 0 | 45 | 0 |
| Lane Group Flow (vph) | 118 | 571 | 0 | 2 | 251 | 0 | 57 | 116 | 0 | 39 | 381 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 12 | | 6 | 6 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 8.2 | 25.7 | | 1.0 | 18.5 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Effective Green, g (s) | 8.2 | 25.7 | | 1.0 | 18.5 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Actuated g/C Ratio | 0.14 | 0.45 | | 0.02 | 0.32 | | 0.31 | 0.31 | | 0.31 | 0.31 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 243 | 869 | | 29 | 525 | | 157 | 571 | | 365 | 550 | |
| v/s Ratio Prot | c0.07 | c0.29 | | 0.00 | 0.15 | | | 0.06 | | | c0.22 | |
| v/s Ratio Perm | | | | | | | 0.11 | | | 0.03 | | |
| v/c Ratio | 0.49 | 0.66 | | 0.07 | 0.48 | | 0.36 | 0.20 | | 0.11 | 0.69 | |
| Uniform Delay, d1 | 22.8 | 12.5 | | 27.9 | 15.7 | | 15.4 | 14.6 | | 14.1 | 17.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.1 | 2.0 | | 1.4 | 0.9 | | 1.9 | 0.2 | | 0.2 | 4.0 | |
| Delay (s) | 24.9 | 14.5 | | 29.3 | 16.7 | | 17.3 | 14.8 | | 14.3 | 21.5 | |
| Level of Service | C | B | | C | B | | B | B | | B | C | |
| Approach Delay (s) | | 16.3 | | | 16.8 | | | 15.6 | | | 20.9 | |
| Approach LOS | | B | | | B | | | B | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 17.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 57.7 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 74.5% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

Baseline + Project PM






















| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 259 | 4 | 244 | 16 | 5 | 12 | 91 | 238 | 1 | 3 | 310 | 95 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.97 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | | 1.00 | 0.89 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1535 | | 1652 | 1516 | | 1652 | 1705 | 1459 | 1711 | 3223 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1535 | | 1652 | 1516 | | 1652 | 1705 | 1459 | 1711 | 3223 | |
| 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) | 282 | 4 | 265 | 17 | 5 | 13 | 99 | 259 | 1 | 3 | 337 | 103 |
| RTOR Reduction (vph) | 0 | 162 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | 0 | 38 | 0 |
| Lane Group Flow (vph) | 282 | 107 | 0 | 17 | 8 | 0 | 99 | 259 | 0 | 3 | 402 | 0 |
| Confl. Peds. (#/hr) | | | | | | 4 | | | 3 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 2 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 15.9 | 28.9 | | 1.4 | 14.4 | | 9.0 | 26.6 | 26.6 | 1.2 | 18.8 | |
| Effective Green, g (s) | 15.9 | 28.9 | | 1.4 | 14.4 | | 9.0 | 26.6 | 26.6 | 1.2 | 18.8 | |
| Actuated g/C Ratio | 0.21 | 0.39 | | 0.02 | 0.19 | | 0.12 | 0.36 | 0.36 | 0.02 | 0.25 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 352 | 594 | | 31 | 292 | | 199 | 607 | 520 | 27 | 812 | |
| v/s Ratio Prot | c0.17 | c0.07 | | 0.01 | 0.00 | | c0.06 | 0.15 | | 0.00 | c0.12 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 0.80 | 0.18 | | 0.55 | 0.03 | | 0.50 | 0.43 | 0.00 | 0.11 | 0.49 | |
| Uniform Delay, d1 | 27.8 | 15.0 | | 36.3 | 24.4 | | 30.7 | 18.2 | 15.4 | 36.2 | 23.8 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 13.9 | 0.3 | | 30.6 | 0.1 | | 4.0 | 1.0 | 0.0 | 3.8 | 1.0 | |
| Delay (s) | 41.8 | 15.3 | | 66.9 | 24.5 | | 34.7 | 19.2 | 15.4 | 40.0 | 24.8 | |
| Level of Service | D | B | | E | C | | C | B | B | D | C | |
| Approach Delay (s) | | 28.9 | | | 45.1 | | | 23.5 | | | 24.9 | |
| Approach LOS | | C | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 26.6 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.51 | | |
| Actuated Cycle Length (s) | 74.6 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 48.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway






















Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|-----|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  |  |  |  | |  |  | | |
| Volume (vph) | 3 | 0 | 0 | 19 | 0 | 74 | 0 | 1244 | 38 | 98 | 755 | 2 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 | |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.91 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.99 | | 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 | 1.00 | | |
| Flt Protected | | 0.95 | | | 0.95 | 1.00 | | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1765 | | | 1562 | 1399 | | 4928 | | 1619 | 3470 | | |
| Flt Permitted | | 0.74 | | | 0.76 | 1.00 | | 1.00 | | 0.18 | 1.00 | | |
| Satd. Flow (perm) | | 1381 | | | 1243 | 1399 | | 4928 | | 301 | 3470 | | |
| 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) | 3 | 0 | 0 | 21 | 0 | 80 | 0 | 1352 | 41 | 107 | 821 | 2 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 45 | 0 | 1 | 0 | 0 | 0 | 0 | |
| Lane Group Flow (vph) | 0 | 3 | 0 | 0 | 21 | 35 | 0 | 1392 | 0 | 107 | 823 | 0 | |
| Confl. Peds. (#/hr) | 2 | | | | | 2 | 5 | | 2 | 2 | | 5 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | | |
| Actuated Green, G (s) | | 9.4 | | | 9.4 | 9.4 | | 92.0 | | 92.0 | 92.0 | | |
| Effective Green, g (s) | | 9.4 | | | 9.4 | 9.4 | | 92.0 | | 92.0 | 92.0 | | |
| Actuated g/C Ratio | | 0.09 | | | 0.09 | 0.09 | | 0.84 | | 0.84 | 0.84 | | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 2.0 | | 2.0 | 2.0 | | |
| Lane Grp Cap (vph) | | 118 | | | 106 | 119 | | 4121 | | 251 | 2902 | | |
| v/s Ratio Prot | | | | | | | | 0.28 | | | 0.24 | | |
| v/s Ratio Perm | | 0.00 | | | 0.02 | c0.03 | | | | c0.36 | | | |
| v/c Ratio | | 0.03 | | | 0.20 | 0.30 | | 0.34 | | 0.43 | 0.28 | | |
| Uniform Delay, d1 | | 46.1 | | | 46.8 | 47.2 | | 2.1 | | 2.3 | 1.9 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 0.90 | | 1.08 | 0.36 | | |
| Incremental Delay, d2 | | 0.1 | | | 0.9 | 1.4 | | 0.2 | | 4.0 | 0.2 | | |
| Delay (s) | | 46.2 | | | 47.7 | 48.6 | | 2.0 | | 6.4 | 0.9 | | |
| Level of Service | | D | | | D | D | | A | | A | A | | |
| Approach Delay (s) | | 46.2 | | | 48.4 | | | 2.0 | | | 1.5 | | |
| Approach LOS | | D | | | D | | | A | | | A | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 3.8 | | | | | | | | | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | | | 0.41 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | | | 45.7% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 30: Merced Street & Republic Ave

Baseline + Project PM

| |  |  |  |  |  |  |  |  |  |  |  |  | | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|----------------------|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  |  | | |
| Volume (vph) | 54 | 3 | 17 | 84 | 4 | 542 | 2 | 923 | 26 | 157 | 680 | 41 | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | | |
| Flt Protected | | 0.96 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (prot) | | 1710 | | | 1778 | 2787 | 1736 | 3471 | 1583 | 3433 | 3401 | | | |
| Flt Permitted | | 0.71 | | | 0.71 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (perm) | | 1252 | | | 1318 | 2787 | 1736 | 3471 | 1583 | 3433 | 3401 | | | |
| 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) | 59 | 3 | 18 | 91 | 4 | 589 | 2 | 1003 | 28 | 171 | 739 | 45 | | |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 0 | 469 | 0 | 0 | 10 | 0 | 3 | 0 | | |
| Lane Group Flow (vph) | 0 | 69 | 0 | 0 | 95 | 120 | 2 | 1003 | 18 | 171 | 781 | 0 | | |
| Confl. Peds. (#/hr) | | | | | | | 5 | | | | | 5 | | |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 1 | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | | |
| Actuated Green, G (s) | | 16.5 | | | 16.5 | 16.5 | 1.2 | 69.2 | 69.2 | 10.8 | 78.8 | | | |
| Effective Green, g (s) | | 16.5 | | | 16.5 | 16.5 | 1.2 | 69.2 | 69.2 | 10.8 | 78.8 | | | |
| Actuated g/C Ratio | | 0.15 | | | 0.15 | 0.15 | 0.01 | 0.63 | 0.63 | 0.10 | 0.72 | | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | | 187 | | | 197 | 418 | 18 | 2183 | 995 | 337 | 2436 | | | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.29 | | c0.05 | 0.23 | | | |
| v/s Ratio Perm | | 0.06 | | | c0.07 | 0.04 | | | 0.01 | | | | | |
| v/c Ratio | | 0.37 | | | 0.48 | 0.29 | 0.11 | 0.46 | 0.02 | 0.51 | 0.32 | | | |
| Uniform Delay, d1 | | 42.1 | | | 42.8 | 41.5 | 53.9 | 10.6 | 7.7 | 47.1 | 5.7 | | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.01 | 1.03 | 1.00 | 1.09 | 0.40 | | | |
| Incremental Delay, d2 | | 1.2 | | | 1.9 | 0.4 | 2.7 | 0.7 | 0.0 | 1.2 | 0.3 | | | |
| Delay (s) | | 43.3 | | | 44.7 | 41.9 | 57.1 | 11.6 | 7.7 | 52.6 | 2.6 | | | |
| Level of Service | | D | | | D | D | E | B | A | D | A | | | |
| Approach Delay (s) | | 43.3 | | | 42.3 | | | 11.6 | | | 11.6 | | | |
| Approach LOS | | D | | | D | | | B | | | B | | | |
| Intersection Summary | | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.1 | | | | | | | | | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | | | 0.47 | | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 60.7% | | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

Baseline + Project PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 47 | 41 | 13 | 523 | 724 | 30 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1651 | 3240 | 3220 | |
| Flt Permitted | 0.95 | 1.00 | 0.34 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 595 | 3240 | 3220 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 51 | 45 | 14 | 568 | 787 | 33 |
| RTOR Reduction (vph) | 0 | 41 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 51 | 4 | 14 | 568 | 816 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 5.4 | 5.4 | 40.6 | 40.6 | 40.6 | |
| Effective Green, g (s) | 5.4 | 5.4 | 40.6 | 40.6 | 40.6 | |
| Actuated g/C Ratio | 0.10 | 0.10 | 0.74 | 0.74 | 0.74 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 162 | 130 | 439 | 2391 | 2376 | |
| v/s Ratio Prot | c0.03 | | | 0.18 | c0.25 | |
| v/s Ratio Perm | | 0.00 | 0.02 | | | |
| v/c Ratio | 0.31 | 0.03 | 0.03 | 0.24 | 0.34 | |
| Uniform Delay, d1 | 23.1 | 22.4 | 1.9 | 2.3 | 2.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.55 | |
| Incremental Delay, d2 | 1.1 | 0.1 | 0.1 | 0.2 | 0.3 | |
| Delay (s) | 24.2 | 22.5 | 2.1 | 2.5 | 1.7 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.4 | | | 2.5 | 1.7 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.4 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.34 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 31.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

Baseline + Project Saturday

HCM Signalized Intersection Capacity Analysis

Baseline + Project SAT

1: Doolittle Dr & Davis St



















| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|-------|------|-------|------|-------|-------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 12 | 70 | 14 | 126 | 74 | 306 | 17 | 301 | 149 | 364 | 405 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3103 | | 3255 | 1689 | 1501 | 1620 | 4655 | 1435 | 3143 | 3207 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3103 | | 3255 | 1689 | 1501 | 1620 | 4655 | 1435 | 3143 | 3207 | |
| 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) | 13 | 76 | 15 | 137 | 80 | 333 | 18 | 327 | 162 | 396 | 440 | 27 |
| RTOR Reduction (vph) | 0 | 13 | 0 | 0 | 0 | 173 | 0 | 0 | 96 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 13 | 78 | 0 | 137 | 80 | 160 | 18 | 327 | 66 | 396 | 464 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | 1 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 0.7 | 11.0 | | 8.5 | 18.8 | 32.1 | 3.5 | 18.7 | 27.2 | 13.3 | 28.5 | |
| Effective Green, g (s) | 0.7 | 11.0 | | 8.5 | 18.8 | 32.1 | 3.5 | 18.7 | 27.2 | 13.3 | 28.5 | |
| Actuated g/C Ratio | 0.01 | 0.16 | | 0.13 | 0.28 | 0.48 | 0.05 | 0.28 | 0.41 | 0.20 | 0.43 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 17 | 510 | | 414 | 475 | 721 | 84 | 1303 | 584 | 625 | 1368 | |
| v/s Ratio Prot | 0.01 | 0.03 | | c0.04 | 0.05 | c0.04 | 0.01 | c0.07 | 0.01 | c0.13 | c0.14 | |
| v/s Ratio Perm | | | | | | 0.06 | | | 0.03 | | | |
| v/c Ratio | 0.76 | 0.15 | | 0.33 | 0.17 | 0.22 | 0.21 | 0.25 | 0.11 | 0.63 | 0.34 | |
| Uniform Delay, d1 | 33.0 | 23.9 | | 26.6 | 18.1 | 10.1 | 30.3 | 18.6 | 12.3 | 24.5 | 12.8 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 99.4 | 0.1 | | 0.2 | 0.2 | 0.1 | 0.5 | 0.1 | 0.0 | 1.5 | 0.3 | |
| Delay (s) | 132.4 | 24.1 | | 26.7 | 18.3 | 10.1 | 30.8 | 18.8 | 12.3 | 26.1 | 13.1 | |
| Level of Service | F | C | | C | B | B | C | B | B | C | B | |
| Approach Delay (s) | | 37.6 | | | 15.5 | | | 17.1 | | | 19.0 | |
| Approach LOS | | D | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 66.8 | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | 41.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

Baseline + Project SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 24 | 385 | 14 | 21 | 587 | 17 | 19 | 18 | 37 | 13 | 18 | 24 |
| 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 |
| Hourly flow rate (vph) | 26 | 418 | 15 | 23 | 638 | 18 | 21 | 20 | 40 | 14 | 20 | 26 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 460 | 679 | 80 | 60 | | | | | | | | |
| Volume Left (vph) | 26 | 23 | 21 | 14 | | | | | | | | |
| Volume Right (vph) | 15 | 18 | 40 | 26 | | | | | | | | |
| Hadj (s) | 0.03 | 0.02 | -0.21 | -0.18 | | | | | | | | |
| Departure Headway (s) | 5.3 | 5.1 | 6.6 | 6.8 | | | | | | | | |
| Degree Utilization, x | 0.68 | 0.95 | 0.15 | 0.11 | | | | | | | | |
| Capacity (veh/h) | 661 | 701 | 506 | 489 | | | | | | | | |
| Control Delay (s) | 18.8 | 45.6 | 10.8 | 10.6 | | | | | | | | |
| Approach Delay (s) | 18.8 | 45.6 | 10.8 | 10.6 | | | | | | | | |
| Approach LOS | C | E | B | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 32.1 | | | | | | | | | |
| Level of Service | | | D | | | | | | | | | |
| Intersection Capacity Utilization | | | 50.9% | ICU Level of Service | | | | | | | | A |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd
































Baseline + Project SAT

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 169 | 302 | 52 | 192 | 444 | 136 | 50 | 203 | 173 | 146 | 252 | 228 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1446 | 1620 | 1739 | 1413 | 1652 | 3240 | 1351 | 1620 | 2851 | 2851 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1446 | 1620 | 1739 | 1413 | 1652 | 3240 | 1351 | 1620 | 2851 | 2851 | |
| 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) | 184 | 328 | 57 | 209 | 483 | 148 | 54 | 221 | 188 | 159 | 274 | 248 | |
| RTOR Reduction (vph) | 0 | 0 | 42 | 0 | 0 | 85 | 0 | 0 | 156 | 0 | 133 | 0 | |
| Lane Group Flow (vph) | 184 | 328 | 15 | 209 | 483 | 63 | 54 | 221 | 32 | 159 | 389 | 0 | |
| Confl. Peds. (#/hr) | | | 4 | | | 7 | | | | | | 3 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 16.8 | 25.0 | 25.0 | 18.1 | 26.3 | 26.3 | 8.1 | 15.7 | 15.7 | 15.9 | 23.5 | 23.5 | |
| Effective Green, g (s) | 16.8 | 25.0 | 25.0 | 18.1 | 26.3 | 26.3 | 8.1 | 15.7 | 15.7 | 15.9 | 23.5 | 23.5 | |
| Actuated g/C Ratio | 0.18 | 0.27 | 0.27 | 0.20 | 0.28 | 0.28 | 0.09 | 0.17 | 0.17 | 0.17 | 0.25 | 0.25 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 299 | 468 | 389 | 316 | 493 | 400 | 144 | 548 | 228 | 277 | 722 | 722 | |
| v/s Ratio Prot | 0.11 | 0.19 | | c0.13 | c0.28 | | 0.03 | 0.07 | | c0.10 | c0.14 | | |
| v/s Ratio Perm | | | 0.01 | | | 0.04 | | | 0.02 | | | | |
| v/c Ratio | 0.62 | 0.70 | 0.04 | 0.66 | 0.98 | 0.16 | 0.38 | 0.40 | 0.14 | 0.57 | 0.54 | 0.54 | |
| Uniform Delay, d1 | 35.0 | 30.5 | 25.0 | 34.5 | 32.9 | 24.9 | 39.9 | 34.3 | 32.8 | 35.3 | 29.9 | 29.9 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.3 | 5.0 | 0.1 | 5.6 | 35.0 | 0.3 | 2.2 | 0.7 | 0.4 | 3.4 | 1.0 | 1.0 | |
| Delay (s) | 39.2 | 35.5 | 25.0 | 40.1 | 67.9 | 25.1 | 42.1 | 35.0 | 33.1 | 38.7 | 30.9 | 30.9 | |
| Level of Service | D | D | C | D | E | C | D | C | C | D | C | C | |
| Approach Delay (s) | | 35.7 | | | 53.4 | | | 35.1 | | | 32.7 | | |
| Approach LOS | | D | | | D | | | D | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 40.6 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.76 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 92.7 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 66.6% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

Baseline + Project SAT

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|--|--|---|---|--|--|--|--|--|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |    | |   |   | |  |   |   |   |   |   | |
| Volume (vph) | 45 | 629 | 65 | 605 | 632 | 107 | 125 | 202 | 678 | 167 | 156 | 42 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4581 | | 3255 | 3163 | | 1678 | 3355 | 2722 | 3255 | 3240 | 1468 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4581 | | 3255 | 3163 | | 1678 | 3355 | 2722 | 3255 | 3240 | 1468 | |
| 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) | 49 | 684 | 71 | 658 | 687 | 116 | 136 | 220 | 737 | 182 | 170 | 46 | |
| RTOR Reduction (vph) | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | |
| Lane Group Flow (vph) | 49 | 746 | 0 | 658 | 793 | 0 | 136 | 220 | 737 | 182 | 170 | 9 | |
| Confl. Peds. (#/hr) | | | 4 | | | 2 | | | 3 | | | 3 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 9.1 | 27.2 | | 42.0 | 60.1 | | 20.0 | 28.0 | 70.0 | 15.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 9.1 | 28.7 | | 42.0 | 61.6 | | 20.0 | 29.5 | 70.0 | 15.0 | 24.5 | 24.5 | |
| Actuated g/C Ratio | 0.07 | 0.22 | | 0.32 | 0.47 | | 0.15 | 0.22 | 0.53 | 0.11 | 0.19 | 0.19 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 108 | 1002 | | 1041 | 1485 | | 255 | 754 | 1452 | 372 | 605 | 274 | |
| v/s Ratio Prot | 0.03 | c0.16 | | c0.20 | 0.25 | | 0.08 | 0.07 | c0.27 | c0.06 | 0.05 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 | |
| v/c Ratio | 0.45 | 0.74 | | 0.63 | 0.53 | | 0.53 | 0.29 | 0.51 | 0.49 | 0.28 | 0.03 | |
| Uniform Delay, d1 | 58.7 | 47.8 | | 38.0 | 24.6 | | 51.3 | 42.2 | 19.6 | 54.5 | 45.8 | 43.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.1 | 3.2 | | 2.9 | 0.5 | | 7.8 | 0.3 | 0.4 | 4.5 | 0.3 | 0.1 | |
| Delay (s) | 62.7 | 51.1 | | 40.9 | 25.1 | | 59.1 | 42.5 | 20.0 | 59.1 | 46.1 | 43.7 | |
| Level of Service | E | D | | D | C | | E | D | B | E | D | D | |
| Approach Delay (s) | | 51.8 | | | 32.2 | | | 29.4 | | | 51.8 | | |
| Approach LOS | | D | | | C | | | C | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 37.6 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.61 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 131.2 | | | | | | | | | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | | | 74.2% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

Baseline + Project SAT



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑ | | ↵ | ↑↑ | | ↵ |
| Volume (veh/h) | 1474 | 0 | 0 | 1329 | 0 | 24 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1602 | 0 | 0 | 1445 | 0 | 26 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | 464 | | | 450 | | |
| pX, platoon unblocked | | | | 0.91 | 0.94 | 0.91 |
| vC, conflicting volume | | | | 1602 | 2324 | 401 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | | 1162 | 1558 | 0 |
| tC, single (s) | | | | 4.1 | 6.8 | 6.9 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | | 2.2 | 3.5 | 3.3 |
| p0 queue free % | | | | 100 | 100 | 97 |
| cM capacity (veh/h) | | | | 543 | 97 | 986 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total | 458 | 458 | 458 | 229 | 0 | 722 | 722 | 26 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 986 |
| Volume to Capacity | 0.27 | 0.27 | 0.27 | 0.13 | 0.00 | 0.42 | 0.42 | 0.03 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.8 |
| Lane LOS | | | | | | | | A |
| Approach Delay (s) | 0.0 | | | | 0.0 | | | 8.8 |
| Approach LOS | | | | | | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|--|----------------------|
| Average Delay | | | 0.1 |
| Intersection Capacity Utilization | 40.1% | | ICU Level of Service |
| Analysis Period (min) | 15 | | A |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

Baseline + Project SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|-------|------|---------------------------|------|------|-------|------|------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 952 | 616 | 476 | 815 | 0 | 0 | 0 | 431 | 0 | 0 | 514 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 1035 | 670 | 517 | 886 | 0 | 0 | 0 | 468 | 0 | 0 | 559 |
| RTOR Reduction (vph) | 0 | 0 | 393 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 283 |
| Lane Group Flow (vph) | 0 | 1035 | 277 | 517 | 886 | 0 | 0 | 0 | 468 | 0 | 0 | 276 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 30.2 | 30.2 | 13.7 | 50.9 | | | | 15.7 | | | 15.7 |
| Effective Green, g (s) | | 30.2 | 30.2 | 13.7 | 50.9 | | | | 15.7 | | | 15.7 |
| Actuated g/C Ratio | | 0.41 | 0.41 | 0.19 | 0.70 | | | | 0.21 | | | 0.21 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1386 | 1091 | 589 | 2336 | | | | 626 | | | 598 |
| v/s Ratio Prot | | c0.31 | | c0.16 | 0.26 | | | | c0.16 | | | 0.10 |
| v/s Ratio Perm | | | 0.10 | | | | | | | | | |
| v/c Ratio | | 0.75 | 0.25 | 0.88 | 0.38 | | | | 0.75 | | | 0.46 |
| Uniform Delay, d1 | | 18.2 | 14.1 | 28.9 | 4.6 | | | | 26.8 | | | 25.0 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 2.2 | 0.1 | 13.9 | 0.1 | | | | 4.9 | | | 0.6 |
| Delay (s) | | 20.4 | 14.2 | 42.8 | 4.7 | | | | 31.7 | | | 25.6 |
| Level of Service | | C | B | D | A | | | | C | | | C |
| Approach Delay (s) | | 18.0 | | | 18.7 | | | 31.7 | | | 25.6 | |
| Approach LOS | | B | | | B | | | C | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.8 | | | HCM 2000 Level of Service | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.78 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 73.1 | | | Sum of lost time (s) | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 48.9% | | | ICU Level of Service | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

Baseline + Project SAT




















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↑↑↑ | ↑↑ | ↗ | | |
| Volume (vph) | 499 | 0 | 815 | 519 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 542 | 0 | 886 | 564 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 115 | 0 | 0 |
| Lane Group Flow (vph) | 542 | 0 | 886 | 449 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 21.0 | | 21.6 | 21.6 | | |
| Effective Green, g (s) | 21.0 | | 21.6 | 21.6 | | |
| Actuated g/C Ratio | 0.41 | | 0.42 | 0.42 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 659 | | 1404 | 640 | | |
| v/s Ratio Prot | c0.33 | | 0.26 | | | |
| v/s Ratio Perm | | | | c0.29 | | |
| v/c Ratio | 0.82 | | 0.63 | 0.70 | | |
| Uniform Delay, d1 | 13.6 | | 11.9 | 12.4 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 8.2 | | 0.9 | 3.5 | | |
| Delay (s) | 21.8 | | 12.8 | 15.8 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 21.8 | 14.0 | | 0.0 | |
| Approach LOS | | C | B | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 16.1 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.76 | | |
| Actuated Cycle Length (s) | 51.6 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 67.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

Baseline + Project SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 13 | 209 | 19 | 24 | 235 | 23 | 26 | 18 | 32 | 16 | 9 | 15 |
| 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 |
| Hourly flow rate (vph) | 14 | 227 | 21 | 26 | 255 | 25 | 28 | 20 | 35 | 17 | 10 | 16 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 14 | 248 | 307 | 83 | 43 | | | | | | | |
| Volume Left (vph) | 14 | 0 | 26 | 28 | 17 | | | | | | | |
| Volume Right (vph) | 0 | 21 | 25 | 35 | 16 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | 0.00 | -0.15 | -0.11 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.1 | 4.7 | 5.2 | 5.3 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.35 | 0.40 | 0.12 | 0.06 | | | | | | | |
| Capacity (veh/h) | 619 | 684 | 744 | 623 | 599 | | | | | | | |
| Control Delay (s) | 7.6 | 9.6 | 10.7 | 8.9 | 8.6 | | | | | | | |
| Approach Delay (s) | 9.5 | | 10.7 | 8.9 | 8.6 | | | | | | | |
| Approach LOS | A | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 9.9 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 42.6% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 23: Doolittle Dr & Fairway Drive/Fairway Dr

Baseline + Project SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 61 | 160 | 80 | 38 | 167 | 99 | 101 | 254 | 37 | 108 | 251 | 65 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.97 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1714 | 1257 | 1615 | 1739 | 1324 | 1711 | 3019 | | 1620 | 2980 | |
| Flt Permitted | | 0.86 | 1.00 | 0.59 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1496 | 1257 | 1008 | 1739 | 1324 | 1711 | 3019 | | 1620 | 2980 | |
| 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) | 66 | 174 | 87 | 41 | 182 | 108 | 110 | 276 | 40 | 117 | 273 | 71 |
| RTOR Reduction (vph) | 0 | 0 | 61 | 0 | 0 | 76 | 0 | 17 | 0 | 0 | 34 | 0 |
| Lane Group Flow (vph) | 0 | 240 | 26 | 41 | 182 | 32 | 110 | 299 | 0 | 117 | 310 | 0 |
| Confl. Peds. (#/hr) | 7 | | 4 | 7 | | 7 | | | | | | 3 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 14.7 | 14.7 | 14.7 | 14.7 | 14.7 | 7.1 | 12.6 | | 7.5 | 13.0 | |
| Effective Green, g (s) | | 14.7 | 14.7 | 14.7 | 14.7 | 14.7 | 7.1 | 12.6 | | 7.5 | 13.0 | |
| Actuated g/C Ratio | | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.14 | 0.25 | | 0.15 | 0.26 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 441 | 371 | 297 | 513 | 390 | 243 | 763 | | 243 | 777 | |
| v/s Ratio Prot | | | | | 0.10 | | 0.06 | 0.10 | | c0.07 | c0.10 | |
| v/s Ratio Perm | | c0.16 | 0.02 | 0.04 | | 0.02 | | | | | | |
| v/c Ratio | | 0.54 | 0.07 | 0.14 | 0.35 | 0.08 | 0.45 | 0.39 | | 0.48 | 0.40 | |
| Uniform Delay, d1 | | 14.7 | 12.6 | 12.9 | 13.8 | 12.7 | 19.6 | 15.4 | | 19.4 | 15.2 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.4 | 0.1 | 0.2 | 0.4 | 0.1 | 1.3 | 0.5 | | 1.5 | 0.5 | |
| Delay (s) | | 16.1 | 12.7 | 13.1 | 14.2 | 12.8 | 20.9 | 15.9 | | 20.9 | 15.6 | |
| Level of Service | | B | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 15.2 | | | 13.6 | | | 17.2 | | | 17.0 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 15.9 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.48 | B |
| Actuated Cycle Length (s) | 49.8 | Sum of lost time (s) |
| Intersection Capacity Utilization | 56.6% | 15.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | B |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

Baseline + Project SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 114 | 153 | 99 | 71 | 166 | 61 | 83 | 418 | 56 | 33 | 396 | 70 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1593 | 1863 | 1348 | 1593 | 1863 | 1372 | 1652 | 3167 | | 1593 | 3150 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1593 | 1863 | 1348 | 1593 | 1863 | 1372 | 1652 | 3167 | | 1593 | 3150 | |
| 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) | 124 | 166 | 108 | 77 | 180 | 66 | 90 | 454 | 61 | 36 | 430 | 76 |
| RTOR Reduction (vph) | 0 | 0 | 81 | 0 | 0 | 51 | 0 | 7 | 0 | 0 | 11 | 0 |
| Lane Group Flow (vph) | 124 | 166 | 27 | 77 | 180 | 15 | 90 | 508 | 0 | 36 | 495 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | | | | 2 | | | 3 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 14.0 | 25.5 | 25.5 | 11.9 | 23.4 | 23.4 | 8.9 | 40.5 | | 5.6 | 37.2 | |
| Effective Green, g (s) | 14.0 | 25.5 | 25.5 | 11.9 | 23.4 | 23.4 | 8.9 | 40.5 | | 5.6 | 37.2 | |
| Actuated g/C Ratio | 0.14 | 0.25 | 0.25 | 0.12 | 0.23 | 0.23 | 0.09 | 0.40 | | 0.05 | 0.36 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 217 | 463 | 335 | 184 | 425 | 313 | 143 | 1251 | | 87 | 1143 | |
| v/s Ratio Prot | c0.08 | 0.09 | | 0.05 | c0.10 | | c0.05 | 0.16 | | 0.02 | c0.16 | |
| v/s Ratio Perm | | | 0.02 | | | 0.01 | | | | | | |
| v/c Ratio | 0.57 | 0.36 | 0.08 | 0.42 | 0.42 | 0.05 | 0.63 | 0.41 | | 0.41 | 0.43 | |
| Uniform Delay, d1 | 41.4 | 31.8 | 29.5 | 42.1 | 33.8 | 30.9 | 45.2 | 22.3 | | 46.9 | 24.7 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.3 | 0.7 | 0.1 | 2.1 | 0.9 | 0.1 | 9.5 | 1.0 | | 4.3 | 0.7 | |
| Delay (s) | 45.7 | 32.4 | 29.7 | 44.2 | 34.7 | 30.9 | 54.7 | 23.3 | | 51.2 | 25.4 | |
| Level of Service | D | C | C | D | C | C | D | C | | D | C | |
| Approach Delay (s) | | 35.8 | | | 36.2 | | | 28.0 | | | 27.1 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 30.8 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.47 | | |
| Actuated Cycle Length (s) | 102.5 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 60.6% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2020 AM

HCM Signalized Intersection Capacity Analysis

2020 AM

1: Doolittle Dr & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|------|-------|------|-------|-------|------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↖ | ↖ | ↗ | ↖ | ↗ | ↗ | ↖ |
| Volume (vph) | 26 | 94 | 35 | 246 | 102 | 857 | 55 | 729 | 443 | 425 | 366 | 44 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3065 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1435 | 3143 | 3178 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3065 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1435 | 3143 | 3178 | |
| 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) | 28 | 102 | 38 | 267 | 111 | 932 | 60 | 792 | 482 | 462 | 398 | 48 |
| RTOR Reduction (vph) | 0 | 32 | 0 | 0 | 0 | 168 | 0 | 0 | 236 | 0 | 7 | 0 |
| Lane Group Flow (vph) | 28 | 108 | 0 | 267 | 111 | 764 | 60 | 792 | 246 | 462 | 439 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 2.7 | 14.0 | | 11.8 | 23.1 | 49.1 | 16.2 | 23.9 | 35.7 | 26.0 | 33.7 | |
| Effective Green, g (s) | 2.7 | 14.0 | | 11.8 | 23.1 | 49.1 | 16.2 | 23.9 | 35.7 | 26.0 | 33.7 | |
| Actuated g/C Ratio | 0.03 | 0.15 | | 0.13 | 0.25 | 0.54 | 0.18 | 0.26 | 0.39 | 0.29 | 0.37 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 49 | 471 | | 422 | 428 | 804 | 288 | 1222 | 562 | 898 | 1176 | |
| v/s Ratio Prot | 0.02 | 0.04 | | c0.08 | 0.07 | c0.27 | 0.04 | c0.17 | 0.06 | 0.15 | 0.14 | |
| v/s Ratio Perm | | | | | | 0.24 | | | 0.11 | | | |
| v/c Ratio | 0.57 | 0.23 | | 0.63 | 0.26 | 0.95 | 0.21 | 0.65 | 0.44 | 0.51 | 0.37 | |
| Uniform Delay, d1 | 43.6 | 33.8 | | 37.5 | 27.1 | 19.8 | 31.9 | 29.8 | 20.3 | 27.2 | 20.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 9.6 | 0.2 | | 2.3 | 0.3 | 20.5 | 0.1 | 1.3 | 0.2 | 0.2 | 0.3 | |
| Delay (s) | 53.2 | 34.0 | | 39.8 | 27.4 | 40.3 | 32.1 | 31.1 | 20.5 | 27.4 | 21.3 | |
| Level of Service | D | C | | D | C | D | C | C | C | C | C | |
| Approach Delay (s) | | 37.2 | | | 39.1 | | | 27.3 | | | 24.4 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 31.2 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.85 | | |
| Actuated Cycle Length (s) | 91.0 | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | 82.2% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2020 AM

2: Phillips Ln & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|-------|-------|------|------|-------|------|------|
| Lane Configurations | ↰ | ↕ | | ↰ | ↕ | ↗ | ↰ | ↕ | | ↰ | ↕ | ↗ |
| Volume (vph) | 74 | 871 | 9 | 23 | 1245 | 142 | 24 | 1 | 86 | 90 | 1 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3173 | | 1620 | 3069 | 1323 | 1678 | 1432 | | 3143 | 1395 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.33 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3173 | | 1620 | 3069 | 1323 | 574 | 1432 | | 3143 | 1395 | |
| 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) | 80 | 947 | 10 | 25 | 1353 | 154 | 26 | 1 | 93 | 98 | 1 | 58 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 82 | 0 | 0 | 50 | 0 |
| Lane Group Flow (vph) | 80 | 957 | 0 | 25 | 1368 | 93 | 26 | 12 | 0 | 98 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 9.5 | 61.6 | | 4.3 | 56.4 | 70.2 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Effective Green, g (s) | 9.5 | 61.6 | | 4.3 | 56.4 | 70.2 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.09 | 0.59 | | 0.04 | 0.54 | 0.67 | 0.12 | 0.12 | | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 146 | 1861 | | 66 | 1648 | 884 | 67 | 167 | | 413 | 183 | |
| v/s Ratio Prot | c0.05 | 0.30 | | 0.02 | c0.45 | 0.01 | | 0.01 | | c0.03 | | |
| v/s Ratio Perm | | | | | | 0.06 | c0.05 | | | | | 0.01 |
| v/c Ratio | 0.55 | 0.51 | | 0.38 | 0.83 | 0.11 | 0.39 | 0.07 | | 0.24 | 0.05 | |
| Uniform Delay, d1 | 45.7 | 12.8 | | 49.0 | 20.3 | 6.2 | 42.9 | 41.3 | | 40.9 | 39.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.20 | 0.66 | 2.12 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 1.0 | | 1.2 | 4.4 | 0.0 | 1.4 | 0.1 | | 0.3 | 0.1 | |
| Delay (s) | 47.9 | 13.9 | | 59.9 | 17.8 | 13.2 | 44.2 | 41.3 | | 41.2 | 40.0 | |
| Level of Service | D | B | | E | B | B | D | D | | D | D | |
| Approach Delay (s) | | 16.5 | | | 18.1 | | | 42.0 | | | 40.7 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.7 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 69.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|-------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↖ | ↗↖↗ | | ↖↗ | ↗↖↗ | | | ↖ | ↗↖↗ | ↖ | ↗ | ↖ |
| Volume (vph) | 8 | 973 | 63 | 222 | 1318 | 41 | 84 | 30 | 172 | 117 | 56 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.91 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4527 | | 3143 | 4751 | | | 1821 | 2806 | 1562 | 1549 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.73 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4527 | | 3143 | 4751 | | | 1373 | 2806 | 1562 | 1549 | |
| 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) | 9 | 1058 | 68 | 241 | 1433 | 45 | 91 | 33 | 187 | 127 | 61 | 27 |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 3 | 0 | 0 | 0 | 137 | 0 | 16 | 0 |
| Lane Group Flow (vph) | 9 | 1120 | 0 | 241 | 1475 | 0 | 0 | 124 | 50 | 127 | 72 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 1.3 | 49.7 | | 13.9 | 62.8 | | | 14.1 | 28.0 | 13.8 | 13.8 | |
| Effective Green, g (s) | 1.3 | 49.7 | | 13.9 | 62.8 | | | 14.1 | 28.0 | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.01 | 0.47 | | 0.13 | 0.60 | | | 0.13 | 0.27 | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 20 | 2142 | | 416 | 2841 | | | 184 | 748 | 205 | 203 | |
| v/s Ratio Prot | 0.01 | c0.25 | | c0.08 | c0.31 | | | | 0.01 | c0.08 | 0.05 | |
| v/s Ratio Perm | | | | | | | | c0.09 | 0.01 | | | |
| v/c Ratio | 0.45 | 0.52 | | 0.58 | 0.52 | | | 0.67 | 0.07 | 0.62 | 0.36 | |
| Uniform Delay, d1 | 51.5 | 19.3 | | 42.8 | 12.3 | | | 43.3 | 28.7 | 43.1 | 41.6 | |
| Progression Factor | 0.70 | 0.54 | | 1.17 | 0.83 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.2 | 0.8 | | 0.8 | 0.5 | | | 7.4 | 0.0 | 3.9 | 0.4 | |
| Delay (s) | 41.5 | 11.2 | | 51.1 | 10.7 | | | 50.7 | 28.8 | 47.0 | 41.9 | |
| Level of Service | D | B | | D | B | | | D | C | D | D | |
| Approach Delay (s) | | 11.4 | | | 16.4 | | | 37.5 | | | 44.9 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.57 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 68.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: I-880 SB ramps & Davis St/Davis Street

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|--------|------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 756 | 487 | 0 | 1226 | 406 | 0 | 0 | 0 | 215 | 0 | 407 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.96 | | | | | 1.00 | 0.86 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3111 | | | | | 1681 | 1421 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3111 | | | | | 1681 | 1421 | 1461 |
| 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 | 822 | 529 | 0 | 1333 | 441 | 0 | 0 | 0 | 234 | 0 | 442 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 34 | 34 |
| Lane Group Flow (vph) | 0 | 822 | 529 | 0 | 1751 | 0 | 0 | 0 | 0 | 211 | 201 | 196 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 71.2 | 105.0 | | 71.2 | | | | | 25.8 | 25.8 | 25.8 |
| Effective Green, g (s) | | 71.2 | 105.0 | | 71.2 | | | | | 25.8 | 25.8 | 25.8 |
| Actuated g/C Ratio | | 0.68 | 1.00 | | 0.68 | | | | | 0.25 | 0.25 | 0.25 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2232 | 1439 | | 2109 | | | | | 413 | 349 | 358 |
| v/s Ratio Prot | | 0.25 | | | c0.56 | | | | | 0.13 | c0.14 | 0.13 |
| v/s Ratio Perm | | | 0.37 | | | | | | | | | |
| v/c Ratio | | 0.37 | 0.37 | | 0.83 | | | | | 0.51 | 0.58 | 0.55 |
| Uniform Delay, d1 | | 7.3 | 0.0 | | 12.5 | | | | | 34.2 | 34.8 | 34.5 |
| Progression Factor | | 0.46 | 1.00 | | 0.91 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.4 | 0.1 | | 3.6 | | | | | 1.1 | 2.3 | 1.7 |
| Delay (s) | | 3.8 | 0.1 | | 14.9 | | | | | 35.2 | 37.1 | 36.2 |
| Level of Service | | A | A | | B | | | | | D | D | D |
| Approach Delay (s) | | 2.3 | | | 14.9 | | | 0.0 | | | 36.2 | |
| Approach LOS | | A | | | B | | | A | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.76 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 70.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

2020 AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|-------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↘↘ | ↗ |
| Volume (vph) | 541 | 599 | 0 | 1087 | 519 | 185 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Fr _t | 0.92 | | | 1.00 | 0.99 | 0.85 |
| Fl _t Protected | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3260 | | | 3539 | 3430 | 1441 |
| Fl _t Permitted | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3260 | | | 3539 | 3430 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 588 | 651 | 0 | 1182 | 564 | 201 |
| RTOR Reduction (vph) | 128 | 0 | 0 | 0 | 3 | 142 |
| Lane Group Flow (vph) | 1111 | 0 | 0 | 1182 | 581 | 39 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 75.4 | | | 75.4 | 22.6 | 22.6 |
| Effective Green, g (s) | 75.4 | | | 75.4 | 22.6 | 22.6 |
| Actuated g/C Ratio | 0.72 | | | 0.72 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2340 | | | 2541 | 738 | 310 |
| v/s Ratio Prot | c0.34 | | | 0.33 | c0.17 | 0.03 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.47 | | | 0.47 | 0.79 | 0.13 |
| Uniform Delay, d ₁ | 6.3 | | | 6.3 | 38.9 | 33.2 |
| Progression Factor | 0.71 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d ₂ | 0.7 | | | 0.6 | 5.1 | 0.1 |
| Delay (s) | 5.2 | | | 6.9 | 44.1 | 33.3 |
| Level of Service | A | | | A | D | C |
| Approach Delay (s) | 5.2 | | | 6.9 | 41.5 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.55 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 57.6% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
6: Doolittle Dr & Williams St

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↕ | | ↕ | ↕↕ | |
| Volume (vph) | 104 | 126 | 19 | 80 | 88 | 141 | 28 | 1058 | 83 | 46 | 410 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | | 0.98 | | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1533 | | | 1691 | 1303 | 1620 | 3039 | | 1562 | 3008 | |
| Flt Permitted | | 0.75 | | | 0.72 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1166 | | | 1253 | 1303 | 1620 | 3039 | | 1562 | 3008 | |
| 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) | 113 | 137 | 21 | 87 | 96 | 153 | 30 | 1150 | 90 | 50 | 446 | 64 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 111 | 0 | 6 | 0 | 0 | 11 | 0 |
| Lane Group Flow (vph) | 0 | 267 | 0 | 0 | 183 | 42 | 30 | 1234 | 0 | 50 | 499 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | 5 | | 2 | 2 | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | |
| Actuated Green, G (s) | | 19.3 | | | 19.3 | 19.3 | 3.3 | 31.5 | | 5.5 | 33.2 | |
| Effective Green, g (s) | | 19.3 | | | 19.3 | 19.3 | 3.3 | 31.5 | | 5.5 | 33.2 | |
| Actuated g/C Ratio | | 0.28 | | | 0.28 | 0.28 | 0.05 | 0.45 | | 0.08 | 0.48 | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | | 323 | | | 347 | 361 | 76 | 1377 | | 123 | 1436 | |
| v/s Ratio Prot | | | | | | | 0.02 | c0.41 | | c0.03 | 0.17 | |
| v/s Ratio Perm | | c0.23 | | | 0.15 | 0.03 | | | | | | |
| v/c Ratio | | 0.83 | | | 0.53 | 0.12 | 0.39 | 0.90 | | 0.41 | 0.35 | |
| Uniform Delay, d1 | | 23.5 | | | 21.2 | 18.7 | 32.1 | 17.5 | | 30.4 | 11.4 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 16.5 | | | 1.9 | 0.2 | 4.6 | 8.1 | | 3.0 | 0.2 | |
| Delay (s) | | 40.1 | | | 23.1 | 18.9 | 36.7 | 25.6 | | 33.4 | 11.6 | |
| Level of Service | | D | | | C | B | D | C | | C | B | |
| Approach Delay (s) | | 40.1 | | | 21.2 | | | 25.9 | | | 13.5 | |
| Approach LOS | | D | | | C | | | C | | | B | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 24.0 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.83 | |
| Actuated Cycle Length (s) | 69.5 | Sum of lost time (s) 13.7 |
| Intersection Capacity Utilization | 70.8% | ICU Level of Service C |
| Analysis Period (min) | 15 | |
| c Critical Lane Group | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

2020 AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 30 | 249 | 365 | 227 | 134 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 33 | 271 | 397 | 247 | 146 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 64 | 0 | 49 |
| Lane Group Flow (vph) | 33 | 271 | 397 | 183 | 146 | 8 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 4.8 | 85.8 | 77.0 | 77.0 | 15.6 | 15.6 |
| Effective Green, g (s) | 4.8 | 85.8 | 77.0 | 77.0 | 15.6 | 15.6 |
| Actuated g/C Ratio | 0.04 | 0.78 | 0.70 | 0.70 | 0.14 | 0.14 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 70 | 1425 | 1193 | 1089 | 221 | 191 |
| v/s Ratio Prot | c0.02 | 0.15 | c0.23 | | c0.09 | |
| v/s Ratio Perm | | | | 0.12 | | 0.01 |
| v/c Ratio | 0.47 | 0.19 | 0.33 | 0.17 | 0.66 | 0.04 |
| Uniform Delay, d1 | 51.4 | 3.1 | 6.5 | 5.6 | 44.7 | 40.8 |
| Progression Factor | 1.00 | 1.00 | 1.18 | 1.78 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.8 | 0.3 | 0.6 | 0.3 | 7.2 | 0.1 |
| Delay (s) | 53.2 | 3.4 | 8.2 | 10.3 | 51.9 | 40.8 |
| Level of Service | D | A | A | B | D | D |
| Approach Delay (s) | | 8.8 | 9.0 | | 48.8 | |
| Approach LOS | | A | A | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 40.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2020 AM

8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBT | EBR | WBL | WBT | WBR | NBL2 | NBL | NBR | SBT | SEL | SER |
|------------------------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | ↑ | ↗ | ↖ | ↗ | | | ↘ | ↗ | ↕ | ↘ | ↘ |
| Volume (vph) | 287 | 112 | 185 | 314 | 1 | 321 | 5 | 224 | 7 | 0 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 9 | 10 | 10 | 11 | 11 | 16 | 12 | 12 | 12 |
| Total Lost time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.97 | 1.00 | 1.00 | | | 1.00 | 0.97 | 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 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.86 | |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| 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 |
| Adj. Flow (vph) | 312 | 122 | 201 | 341 | 1 | 349 | 5 | 243 | 8 | 0 | 8 |
| RTOR Reduction (vph) | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 102 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 312 | 42 | 201 | 342 | 0 | 0 | 354 | 141 | 8 | 8 | 0 |
| Confl. Peds. (#/hr) | | 14 | | | | | | 2 | | 2 | |
| Confl. Bikes (#/hr) | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Turn Type | NA | Perm | Prot | NA | | Prot | Prot | Perm | NA | Prot | |
| Protected Phases | 2 | | 1 | 6 | | 4 | 4 | | 8 | 7 | |
| Permitted Phases | | 2 | | | | | | 4 | | | |
| Actuated Green, G (s) | 37.7 | 37.7 | 18.3 | 60.0 | | | 29.6 | 29.6 | 1.4 | 2.4 | |
| Effective Green, g (s) | 37.7 | 37.7 | 18.3 | 60.0 | | | 29.6 | 29.6 | 1.4 | 2.4 | |
| Actuated g/C Ratio | 0.34 | 0.34 | 0.17 | 0.55 | | | 0.27 | 0.27 | 0.01 | 0.02 | |
| Clearance Time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 602 | 493 | 259 | 929 | | | 451 | 459 | 23 | 34 | |
| v/s Ratio Prot | c0.18 | | c0.13 | 0.20 | | | c0.21 | | c0.00 | c0.01 | |
| v/s Ratio Perm | | 0.03 | | | | | | 0.08 | | | |
| v/c Ratio | 0.52 | 0.08 | 0.78 | 0.37 | | | 0.78 | 0.31 | 0.35 | 0.24 | |
| Uniform Delay, d1 | 28.9 | 24.5 | 43.9 | 14.2 | | | 37.3 | 32.0 | 53.8 | 52.9 | |
| Progression Factor | 0.96 | 1.15 | 1.00 | 1.00 | | | 0.64 | 0.58 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.1 | 0.3 | 13.5 | 1.1 | | | 7.9 | 0.3 | 8.9 | 3.5 | |
| Delay (s) | 30.9 | 28.4 | 57.4 | 15.3 | | | 31.7 | 18.8 | 62.8 | 56.4 | |
| Level of Service | C | C | E | B | | | C | B | E | E | |
| Approach Delay (s) | 30.2 | | | 30.9 | | | | | 62.8 | 56.4 | |
| Approach LOS | C | | | C | | | | | E | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 29.3 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 20.6 |
| Intersection Capacity Utilization | 82.1% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

2020 AM



















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | ↑ | ↗ | ↘ | |
| Volume (veh/h) | 0 | 80 | 132 | 14 | 35 | 0 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 87 | 143 | 15 | 38 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 159 | | | | 230 | 143 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 159 | | | | 230 | 143 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 95 | 100 |
| cM capacity (veh/h) | 1421 | | | | 758 | 904 |

| Direction, Lane # | EB 1 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|
| Volume Total | 87 | 143 | 15 | 38 |
| Volume Left | 0 | 0 | 0 | 38 |
| Volume Right | 0 | 0 | 15 | 0 |
| cSH | 1700 | 1700 | 1700 | 758 |
| Volume to Capacity | 0.05 | 0.08 | 0.01 | 0.05 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 4 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 10.0 |
| Lane LOS | | | | B |
| Approach Delay (s) | 0.0 | 0.0 | | 10.0 |
| Approach LOS | | | | B |

| Intersection Summary | | | |
|-----------------------------------|--|-------|------------------------|
| Average Delay | | 1.3 | |
| Intersection Capacity Utilization | | 16.9% | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2020 AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 33 | 130 | 10 | 27 | 93 | 81 | 10 | 130 | 53 | 45 | 51 | 14 |
| 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 |
| Hourly flow rate (vph) | 36 | 141 | 11 | 29 | 101 | 88 | 11 | 141 | 58 | 49 | 55 | 15 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 188 | 218 | 210 | 120 | | | | | | | | |
| Volume Left (vph) | 36 | 29 | 11 | 49 | | | | | | | | |
| Volume Right (vph) | 11 | 88 | 58 | 15 | | | | | | | | |
| Hadj (s) | 0.04 | -0.18 | -0.12 | 0.04 | | | | | | | | |
| Departure Headway (s) | 5.1 | 4.9 | 5.0 | 5.3 | | | | | | | | |
| Degree Utilization, x | 0.27 | 0.29 | 0.29 | 0.18 | | | | | | | | |
| Capacity (veh/h) | 648 | 685 | 664 | 613 | | | | | | | | |
| Control Delay (s) | 10.0 | 9.9 | 10.0 | 9.4 | | | | | | | | |
| Approach Delay (s) | 10.0 | 9.9 | 10.0 | 9.4 | | | | | | | | |
| Approach LOS | A | A | B | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 9.9 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 40.7% | ICU Level of Service | | | | | | | | A |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 68 | 210 | 65 | 157 | 152 | 382 | 10 | 749 | 248 | 202 | 278 | 32 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 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 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1447 | 1620 | 1739 | 1392 | 1652 | 3240 | 1331 | 1620 | 3027 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1447 | 1620 | 1739 | 1392 | 1652 | 3240 | 1331 | 1620 | 3027 | |
| 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) | 74 | 228 | 71 | 171 | 165 | 415 | 11 | 814 | 270 | 220 | 302 | 35 |
| RTOR Reduction (vph) | 0 | 0 | 58 | 0 | 0 | 313 | 0 | 0 | 80 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 74 | 228 | 13 | 171 | 165 | 102 | 11 | 814 | 190 | 220 | 332 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 9.8 | 20.6 | 20.6 | 18.0 | 28.8 | 28.8 | 1.5 | 38.6 | 38.6 | 21.8 | 58.9 | |
| Effective Green, g (s) | 9.8 | 20.6 | 20.6 | 18.0 | 28.8 | 28.8 | 1.5 | 38.6 | 38.6 | 21.8 | 58.9 | |
| Actuated g/C Ratio | 0.08 | 0.18 | 0.18 | 0.15 | 0.25 | 0.25 | 0.01 | 0.33 | 0.33 | 0.19 | 0.50 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 138 | 306 | 254 | 249 | 428 | 342 | 21 | 1068 | 439 | 301 | 1523 | |
| v/s Ratio Prot | 0.04 | c0.13 | | c0.11 | 0.09 | | 0.01 | c0.25 | | c0.14 | 0.11 | |
| v/s Ratio Perm | | | 0.01 | | | 0.07 | | | 0.14 | | | |
| v/c Ratio | 0.54 | 0.75 | 0.05 | 0.69 | 0.39 | 0.30 | 0.52 | 0.76 | 0.43 | 0.73 | 0.22 | |
| Uniform Delay, d1 | 51.4 | 45.7 | 40.1 | 46.8 | 36.7 | 35.9 | 57.4 | 35.1 | 30.6 | 44.8 | 16.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.0 | 10.1 | 0.1 | 8.3 | 0.8 | 0.7 | 27.4 | 3.5 | 0.9 | 9.4 | 0.1 | |
| Delay (s) | 56.5 | 55.8 | 40.2 | 55.1 | 37.5 | 36.6 | 84.8 | 38.6 | 31.6 | 54.2 | 16.3 | |
| Level of Service | E | E | D | E | D | D | F | D | C | D | B | |
| Approach Delay (s) | | 52.9 | | | 41.0 | | | 37.3 | | | 31.3 | |
| Approach LOS | | D | | | D | | | D | | | C | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 39.2 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.74 | D |
| Actuated Cycle Length (s) | 117.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 66.8% | ICU Level of Service |
| Analysis Period (min) | 15 | C |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

12: Merced St & Marina Blvd

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|-------|-------|------|------|
| Lane Configurations | ↖ | ↗↖↗ | | ↖↗ | ↗↖ | | ↖ | ↗↖↗ | ↗↖↗ | ↖↗ | ↗↖↗ | ↖↗ |
| Volume (vph) | 41 | 621 | 38 | 885 | 769 | 242 | 65 | 251 | 504 | 164 | 153 | 28 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 4.0 | 4.0 | 5.5 | 5.5 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4615 | | 3255 | 3111 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4615 | | 3255 | 3111 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| 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) | 45 | 675 | 41 | 962 | 836 | 263 | 71 | 273 | 548 | 178 | 166 | 30 |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| Lane Group Flow (vph) | 45 | 710 | 0 | 962 | 1072 | 0 | 71 | 273 | 548 | 178 | 166 | 6 |
| Confl. Peds. (#/hr) | | | | | | | 3 | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 6.0 | 21.0 | | 34.0 | 49.0 | | 13.0 | 25.0 | 63.0 | 11.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 6.0 | 21.0 | | 34.0 | 49.0 | | 13.0 | 25.0 | 63.0 | 11.0 | 23.0 | 23.0 |
| Actuated g/C Ratio | 0.05 | 0.19 | | 0.31 | 0.45 | | 0.12 | 0.23 | 0.57 | 0.10 | 0.21 | 0.21 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 85 | 881 | | 1006 | 1385 | | 198 | 762 | 1549 | 325 | 677 | 307 |
| v/s Ratio Prot | 0.03 | c0.15 | | c0.30 | 0.34 | | 0.04 | 0.08 | c0.20 | c0.05 | 0.05 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 |
| v/c Ratio | 0.53 | 0.81 | | 0.96 | 0.77 | | 0.36 | 0.36 | 0.35 | 0.55 | 0.25 | 0.02 |
| Uniform Delay, d1 | 50.6 | 42.5 | | 37.3 | 25.8 | | 44.7 | 35.8 | 12.6 | 47.1 | 36.3 | 34.6 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.04 | 0.67 | 0.17 | 1.01 | 0.72 | 1.00 |
| Incremental Delay, d2 | 7.5 | 7.8 | | 19.6 | 4.3 | | 4.9 | 0.4 | 0.2 | 6.0 | 0.2 | 0.0 |
| Delay (s) | 58.2 | 50.3 | | 56.9 | 30.1 | | 51.6 | 24.4 | 2.3 | 53.5 | 26.3 | 34.6 |
| Level of Service | E | D | | E | C | | D | C | A | D | C | C |
| Approach Delay (s) | | 50.8 | | | 42.6 | | | 13.0 | | | 39.9 | |
| Approach LOS | | D | | | D | | | B | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 37.4 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.72 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 79.4% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2020 AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑↑↑ | | ↖ | ↑↑ | | ↗ |
| Volume (vph) | 1118 | 12 | 135 | 0 | 0 | 184 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 1.00 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6398 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6398 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1215 | 13 | 147 | 0 | 0 | 200 |
| RTOR Reduction (vph) | 4 | 0 | 0 | 0 | 0 | 50 |
| Lane Group Flow (vph) | 1224 | 0 | 147 | 0 | 0 | 150 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 18.9 | | 6.0 | | | 6.0 |
| Effective Green, g (s) | 18.9 | | 6.0 | | | 6.0 |
| Actuated g/C Ratio | 0.55 | | 0.17 | | | 0.17 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 3515 | | 308 | | | 280 |
| v/s Ratio Prot | c0.19 | | 0.08 | | | c0.09 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.35 | | 0.48 | | | 0.53 |
| Uniform Delay, d1 | 4.3 | | 12.8 | | | 12.9 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.1 | | 1.2 | | | 2.0 |
| Delay (s) | 4.4 | | 14.0 | | | 14.9 |
| Level of Service | A | | B | | | B |
| Approach Delay (s) | 4.4 | | | 14.0 | 14.9 | |
| Approach LOS | A | | | B | B | |

Intersection Summary

| | | | |
|--|-------|---------------------------|-----|
| HCM 2000 Control Delay | 6.6 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 34.4 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 35.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| Description: WBT Removed as they are not part of signalized intersection | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|------|------|------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1003 | 480 | 396 | 1208 | 0 | 0 | 0 | 458 | 0 | 0 | 939 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 1090 | 522 | 430 | 1313 | 0 | 0 | 0 | 498 | 0 | 0 | 1021 |
| RTOR Reduction (vph) | 0 | 0 | 318 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 |
| Lane Group Flow (vph) | 0 | 1090 | 204 | 430 | 1313 | 0 | 0 | 0 | 498 | 0 | 0 | 937 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 34.1 | 34.1 | 12.9 | 54.0 | | | | 26.6 | | | 26.6 |
| Effective Green, g (s) | | 34.1 | 34.1 | 12.9 | 54.0 | | | | 26.6 | | | 26.6 |
| Actuated g/C Ratio | | 0.39 | 0.39 | 0.15 | 0.62 | | | | 0.31 | | | 0.31 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1313 | 1034 | 465 | 2080 | | | | 890 | | | 851 |
| v/s Ratio Prot | | c0.32 | | c0.14 | 0.39 | | | | 0.17 | | | c0.34 |
| v/s Ratio Perm | | | 0.08 | | | | | | | | | |
| v/c Ratio | | 0.83 | 0.20 | 0.92 | 0.63 | | | | 0.56 | | | 1.10 |
| Uniform Delay, d1 | | 23.9 | 17.5 | 36.6 | 10.3 | | | | 25.3 | | | 30.2 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 4.6 | 0.1 | 24.2 | 0.6 | | | | 0.8 | | | 62.3 |
| Delay (s) | | 28.5 | 17.6 | 60.8 | 11.0 | | | | 26.1 | | | 92.5 |
| Level of Service | | C | B | E | B | | | | C | | | F |
| Approach Delay (s) | | 25.0 | | | 23.3 | | | 26.1 | | | 92.5 | |
| Approach LOS | | C | | | C | | | C | | | F | |

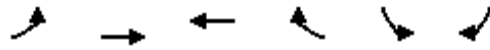
| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 38.6 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.94 | | |
| Actuated Cycle Length (s) | 87.1 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 73.3% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps

2020 AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 525 | 0 | 755 | 426 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 571 | 0 | 821 | 463 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 136 | 0 | 0 |
| Lane Group Flow (vph) | 571 | 0 | 821 | 327 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 23.2 | | 20.5 | 20.5 | | |
| Effective Green, g (s) | 23.2 | | 20.5 | 20.5 | | |
| Actuated g/C Ratio | 0.44 | | 0.39 | 0.39 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 713 | | 1305 | 595 | | |
| v/s Ratio Prot | c0.35 | | c0.24 | | | |
| v/s Ratio Perm | | | | 0.21 | | |
| v/c Ratio | 0.80 | | 0.63 | 0.55 | | |
| Uniform Delay, d1 | 12.8 | | 13.0 | 12.5 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 6.4 | | 1.0 | 1.0 | | |
| Delay (s) | 19.2 | | 14.0 | 13.6 | | |
| Level of Service | B | | B | B | | |
| Approach Delay (s) | | 19.2 | 13.8 | | 0.0 | |
| Approach LOS | | B | B | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 15.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.72 | | |
| Actuated Cycle Length (s) | 52.7 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 63.0% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|-------|-------|------|-------|------|------|-------|-------|------|
| Lane Configurations | ↘ | ↑↑↑ | ↗ | ↘ | ↑↑↑ | | ↘ | ↗ | ↗ | | ↗ | ↗ |
| Volume (vph) | 135 | 828 | 395 | 137 | 814 | 35 | 199 | 33 | 72 | 18 | 83 | 107 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4621 | | 1539 | 1564 | 1513 | | 1750 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4621 | | 1539 | 1564 | 1513 | | 1750 | 1489 |
| 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) | 147 | 900 | 429 | 149 | 885 | 38 | 216 | 36 | 78 | 20 | 90 | 116 |
| RTOR Reduction (vph) | 0 | 0 | 246 | 0 | 4 | 0 | 0 | 0 | 65 | 0 | 0 | 105 |
| Lane Group Flow (vph) | 147 | 900 | 183 | 149 | 919 | 0 | 125 | 127 | 13 | 0 | 110 | 11 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 14.0 | 42.6 | 42.6 | 12.0 | 40.6 | | 16.8 | 16.8 | 16.8 | | 9.4 | 9.4 |
| Effective Green, g (s) | 14.0 | 42.6 | 42.6 | 12.0 | 40.6 | | 16.8 | 16.8 | 16.8 | | 9.4 | 9.4 |
| Actuated g/C Ratio | 0.14 | 0.43 | 0.43 | 0.12 | 0.41 | | 0.17 | 0.17 | 0.17 | | 0.09 | 0.09 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 226 | 1983 | 652 | 201 | 1876 | | 258 | 262 | 254 | | 164 | 139 |
| v/s Ratio Prot | c0.09 | 0.19 | | c0.09 | c0.20 | | c0.08 | 0.08 | | | c0.06 | 0.01 |
| v/s Ratio Perm | | | 0.12 | | | | | | 0.01 | | | |
| v/c Ratio | 0.65 | 0.45 | 0.28 | 0.74 | 0.49 | | 0.48 | 0.48 | 0.05 | | 0.67 | 0.08 |
| Uniform Delay, d1 | 40.7 | 20.4 | 18.7 | 42.5 | 22.0 | | 37.7 | 37.7 | 34.9 | | 43.8 | 41.3 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.89 | 0.86 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 7.2 | 0.8 | 1.1 | 13.3 | 0.8 | | 2.0 | 1.9 | 0.1 | | 11.2 | 0.3 |
| Delay (s) | 47.9 | 21.2 | 19.8 | 51.1 | 19.7 | | 39.6 | 39.6 | 35.0 | | 55.0 | 41.7 |
| Level of Service | D | C | B | D | B | | D | D | D | | D | D |
| Approach Delay (s) | | 23.4 | | | 24.0 | | | 38.5 | | | 48.2 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 27.0 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.56 | C |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 54.5% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 54 | 532 | 223 | 147 | 666 | 14 | 227 | 168 | 397 | 20 | 167 | 43 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3278 | | 3143 | 3240 | 1660 | 3204 | 3126 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3278 | | 3143 | 3240 | 1660 | 3204 | 3126 | |
| 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) | 59 | 578 | 242 | 160 | 724 | 15 | 247 | 183 | 432 | 22 | 182 | 47 |
| RTOR Reduction (vph) | 0 | 0 | 149 | 0 | 1 | 0 | 0 | 0 | 293 | 0 | 25 | 0 |
| Lane Group Flow (vph) | 59 | 578 | 93 | 160 | 738 | 0 | 247 | 183 | 139 | 22 | 204 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 6.6 | 38.3 | 38.3 | 14.9 | 46.6 | | 15.6 | 26.5 | 26.5 | 2.3 | 13.6 | |
| Effective Green, g (s) | 6.6 | 38.3 | 38.3 | 14.9 | 46.6 | | 15.6 | 26.5 | 26.5 | 2.3 | 13.6 | |
| Actuated g/C Ratio | 0.07 | 0.38 | 0.38 | 0.15 | 0.47 | | 0.16 | 0.26 | 0.26 | 0.02 | 0.14 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 106 | 1265 | 574 | 246 | 1527 | | 490 | 858 | 439 | 73 | 425 | |
| v/s Ratio Prot | 0.04 | 0.17 | | c0.10 | c0.23 | | c0.08 | 0.06 | | 0.01 | c0.07 | |
| v/s Ratio Perm | | | 0.06 | | | | | | 0.08 | | | |
| v/c Ratio | 0.56 | 0.46 | 0.16 | 0.65 | 0.48 | | 0.50 | 0.21 | 0.32 | 0.30 | 0.48 | |
| Uniform Delay, d1 | 45.3 | 23.1 | 20.3 | 40.1 | 18.4 | | 38.7 | 28.6 | 29.5 | 48.1 | 39.9 | |
| Progression Factor | 1.36 | 0.32 | 0.02 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.3 | 1.1 | 0.6 | 6.7 | 1.1 | | 1.1 | 0.2 | 0.6 | 3.2 | 1.2 | |
| Delay (s) | 64.8 | 8.6 | 0.9 | 46.8 | 19.5 | | 39.8 | 28.8 | 30.0 | 51.2 | 41.1 | |
| Level of Service | E | A | A | D | B | | D | C | C | D | D | |
| Approach Delay (s) | | 10.2 | | | 24.4 | | | 32.6 | | | 42.0 | |
| Approach LOS | | B | | | C | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 24.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.53 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 54.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 318 | 243 | 369 | 9 | 265 | 78 | 399 | 1047 | 8 | 47 | 487 | 168 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1736 | 1479 | 1652 | 3534 | | 1652 | 3161 | |
| Flt Permitted | 0.22 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 385 | 1739 | 1770 | | 1714 | 1479 | 1652 | 3534 | | 1652 | 3161 | |
| 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) | 346 | 264 | 401 | 10 | 288 | 85 | 434 | 1138 | 9 | 51 | 529 | 183 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 67 | 0 | 1 | 0 | 0 | 36 | 0 |
| Lane Group Flow (vph) | 346 | 264 | 401 | 0 | 298 | 18 | 434 | 1146 | 0 | 51 | 676 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 38.6 | 38.6 | 95.0 | | 20.1 | 20.1 | 22.4 | 34.8 | | 7.1 | 19.0 | |
| Effective Green, g (s) | 38.6 | 38.6 | 95.0 | | 20.1 | 20.1 | 22.4 | 34.8 | | 7.1 | 19.0 | |
| Actuated g/C Ratio | 0.41 | 0.41 | 1.00 | | 0.21 | 0.21 | 0.24 | 0.37 | | 0.07 | 0.20 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 349 | 706 | 1770 | | 362 | 312 | 389 | 1294 | | 123 | 632 | |
| v/s Ratio Prot | c0.15 | 0.15 | | | | | c0.26 | 0.32 | | 0.03 | c0.21 | |
| v/s Ratio Perm | c0.25 | | 0.23 | | 0.17 | 0.01 | | | | | | |
| v/c Ratio | 0.99 | 0.37 | 0.23 | | 0.82 | 0.06 | 1.12 | 0.89 | | 0.41 | 1.07 | |
| Uniform Delay, d1 | 23.4 | 19.7 | 0.0 | | 35.8 | 29.9 | 36.3 | 28.2 | | 42.0 | 38.0 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.10 | 0.75 | | 0.87 | 0.88 | |
| Incremental Delay, d2 | 45.7 | 0.5 | 0.3 | | 14.6 | 0.1 | 80.2 | 8.9 | | 2.2 | 55.1 | |
| Delay (s) | 69.0 | 20.2 | 0.3 | | 50.4 | 30.0 | 120.1 | 30.1 | | 38.7 | 88.6 | |
| Level of Service | E | C | A | | D | C | F | C | | D | F | |
| Approach Delay (s) | | 29.0 | | | 45.9 | | | 54.8 | | | 85.3 | |
| Approach LOS | | C | | | D | | | D | | | F | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 53.2 | HCM 2000 Level of Service D |
| HCM 2000 Volume to Capacity ratio | 1.08 | |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) 19.0 |
| Intersection Capacity Utilization | 91.5% | ICU Level of Service F |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

2020 AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 19 | 8 | 17 | 51 | 106 | 17 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 21 | 9 | 18 | 55 | 115 | 18 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 29 | 74 | 134 | | | |
| Volume Left (vph) | 21 | 18 | 0 | | | |
| Volume Right (vph) | 9 | 0 | 18 | | | |
| Hadj (s) | 0.00 | 0.08 | -0.05 | | | |
| Departure Headway (s) | 4.3 | 4.2 | 4.0 | | | |
| Degree Utilization, x | 0.04 | 0.09 | 0.15 | | | |
| Capacity (veh/h) | 788 | 840 | 889 | | | |
| Control Delay (s) | 7.5 | 7.6 | 7.7 | | | |
| Approach Delay (s) | 7.5 | 7.6 | 7.7 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.6 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 23.6% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

2020 AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 7 | 3 | 5 | 62 | 102 | 11 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 8 | 3 | 5 | 67 | 111 | 12 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 11 | 73 | 123 | | | |
| Volume Left (vph) | 8 | 5 | 0 | | | |
| Volume Right (vph) | 3 | 0 | 12 | | | |
| Hadj (s) | -0.01 | 0.05 | -0.02 | | | |
| Departure Headway (s) | 4.3 | 4.1 | 4.0 | | | |
| Degree Utilization, x | 0.01 | 0.08 | 0.14 | | | |
| Capacity (veh/h) | 795 | 862 | 897 | | | |
| Control Delay (s) | 7.4 | 7.5 | 7.6 | | | |
| Approach Delay (s) | 7.4 | 7.5 | 7.6 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.5 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 17.4% | ICU Level of Service | | A |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive



















2020 AM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|-------|-------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 72 | 32 | 60 | 41 | 16 | 88 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 78 | 35 | 65 | 45 | 17 | 96 |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 113 | 110 | 113 | | | |
| Volume Left (vph) | 78 | 0 | 17 | | | |
| Volume Right (vph) | 35 | 45 | 0 | | | |
| Hadj (s) | -0.01 | -0.21 | 0.06 | | | |
| Departure Headway (s) | 4.4 | 4.1 | 4.3 | | | |
| Degree Utilization, x | 0.14 | 0.12 | 0.14 | | | |
| Capacity (veh/h) | 783 | 848 | 803 | | | |
| Control Delay (s) | 8.1 | 7.7 | 8.0 | | | |
| Approach Delay (s) | 8.1 | 7.7 | 8.0 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.9 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 24.8% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2020 AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | Stop | | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 12 | 127 | 9 | 15 | 89 | 34 | 9 | 62 | 46 | 30 | 17 | 8 |
| 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 |
| Hourly flow rate (vph) | 13 | 138 | 10 | 16 | 97 | 37 | 10 | 67 | 50 | 33 | 18 | 9 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 13 | 148 | 150 | 127 | 60 | | | | | | | |
| Volume Left (vph) | 13 | 0 | 16 | 10 | 33 | | | | | | | |
| Volume Right (vph) | 0 | 10 | 37 | 50 | 9 | | | | | | | |
| Hadj (s) | 0.53 | -0.01 | -0.09 | -0.19 | 0.06 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.1 | 4.6 | 4.5 | 4.9 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.21 | 0.19 | 0.16 | 0.08 | | | | | | | |
| Capacity (veh/h) | 616 | 677 | 745 | 739 | 679 | | | | | | | |
| Control Delay (s) | 7.5 | 8.2 | 8.6 | 8.4 | 8.3 | | | | | | | |
| Approach Delay (s) | 8.2 | | 8.6 | 8.4 | 8.3 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.4 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 34.5% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↖ | ↗ | ↖ | ↗ | ↖ | ↖ | ↖↗ | | ↖ | ↖↗ | |
| Volume (vph) | 97 | 81 | 30 | 47 | 86 | 292 | 32 | 535 | 47 | 111 | 304 | 36 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | | 0.97 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1685 | 1259 | 1620 | 1739 | 1317 | 1711 | 3035 | | 1620 | 3027 | |
| Flt Permitted | | 0.78 | 1.00 | 0.63 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1350 | 1259 | 1082 | 1739 | 1317 | 1711 | 3035 | | 1620 | 3027 | |
| 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) | 105 | 88 | 33 | 51 | 93 | 317 | 35 | 582 | 51 | 121 | 330 | 39 |
| RTOR Reduction (vph) | 0 | 0 | 25 | 0 | 0 | 236 | 0 | 9 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 0 | 193 | 8 | 51 | 93 | 81 | 35 | 624 | 0 | 121 | 359 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | 2.6 | 19.1 | | 7.8 | 24.3 | |
| Effective Green, g (s) | | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | 2.6 | 19.1 | | 7.8 | 24.3 | |
| Actuated g/C Ratio | | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.05 | 0.34 | | 0.14 | 0.43 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 347 | 323 | 278 | 447 | 338 | 78 | 1027 | | 224 | 1304 | |
| v/s Ratio Prot | | | | | 0.05 | | 0.02 | c0.21 | | c0.07 | 0.12 | |
| v/s Ratio Perm | | c0.14 | 0.01 | 0.05 | | 0.06 | | | | | | |
| v/c Ratio | | 0.56 | 0.03 | 0.18 | 0.21 | 0.24 | 0.45 | 0.61 | | 0.54 | 0.28 | |
| Uniform Delay, d1 | | 18.2 | 15.7 | 16.3 | 16.4 | 16.6 | 26.2 | 15.5 | | 22.6 | 10.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.9 | 0.0 | 0.3 | 0.2 | 0.4 | 4.1 | 1.2 | | 2.6 | 0.2 | |
| Delay (s) | | 20.1 | 15.7 | 16.7 | 16.7 | 17.0 | 30.3 | 16.7 | | 25.3 | 10.5 | |
| Level of Service | | C | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 19.5 | | | 16.9 | | | 17.4 | | | 14.2 | |
| Approach LOS | | B | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.7 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.58 | | |
| Actuated Cycle Length (s) | 56.4 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 58.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | ↖ | ↑ | ↗ | ↖ | ↑ | ↗ | ↖ | ↑↗ | | ↖ | ↑↗ | |
| Volume (vph) | 114 | 129 | 48 | 164 | 305 | 55 | 120 | 566 | 153 | 61 | 421 | 89 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3121 | | 1593 | 3140 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3121 | | 1593 | 3140 | |
| 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) | 124 | 140 | 52 | 178 | 332 | 60 | 130 | 615 | 166 | 66 | 458 | 97 |
| RTOR Reduction (vph) | 0 | 0 | 41 | 0 | 0 | 45 | 0 | 21 | 0 | 0 | 16 | 0 |
| Lane Group Flow (vph) | 124 | 140 | 11 | 178 | 332 | 15 | 130 | 760 | 0 | 66 | 539 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 13.4 | 22.6 | 22.6 | 17.4 | 26.6 | 26.6 | 21.3 | 43.1 | | 7.9 | 29.7 | |
| Effective Green, g (s) | 13.4 | 22.6 | 22.6 | 17.4 | 26.6 | 26.6 | 21.3 | 43.1 | | 7.9 | 29.7 | |
| Actuated g/C Ratio | 0.12 | 0.21 | 0.21 | 0.16 | 0.24 | 0.24 | 0.19 | 0.39 | | 0.07 | 0.27 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 192 | 379 | 268 | 251 | 450 | 326 | 319 | 1222 | | 114 | 847 | |
| v/s Ratio Prot | 0.08 | 0.08 | | c0.11 | c0.18 | | 0.08 | c0.24 | | 0.04 | c0.17 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.65 | 0.37 | 0.04 | 0.71 | 0.74 | 0.04 | 0.41 | 0.62 | | 0.58 | 0.64 | |
| Uniform Delay, d1 | 46.0 | 37.6 | 35.0 | 43.9 | 38.5 | 32.0 | 38.8 | 26.9 | | 49.4 | 35.4 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.92 | 0.91 | | 0.70 | 0.48 | |
| Incremental Delay, d2 | 8.1 | 0.8 | 0.1 | 9.5 | 6.6 | 0.1 | 1.1 | 2.3 | | 8.0 | 3.5 | |
| Delay (s) | 54.1 | 38.4 | 35.1 | 53.4 | 45.1 | 32.0 | 37.0 | 26.8 | | 42.4 | 20.3 | |
| Level of Service | D | D | D | D | D | C | D | C | | D | C | |
| Approach Delay (s) | | 44.0 | | | 46.3 | | | 28.2 | | | 22.7 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 33.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.71 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 67.4% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|--------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 32 | 256 | 7 | 6 | 498 | 202 | 2 | 0 | 0 | 39 | 0 | 19 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | | 1.00 |
| Frt | 1.00 | 1.00 | | | 0.96 | | | 1.00 | | 1.00 | | 0.85 |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.95 | | 0.95 | | 1.00 |
| Satd. Flow (prot) | 1770 | 1855 | | | 3386 | | | 1770 | | 1770 | | 1583 |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.95 | | 0.76 | | 1.00 |
| Satd. Flow (perm) | 1770 | 1855 | | | 3226 | | | 1770 | | 1409 | | 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) | 35 | 278 | 8 | 7 | 541 | 220 | 2 | 0 | 0 | 42 | 0 | 21 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| Lane Group Flow (vph) | 35 | 285 | 0 | 0 | 716 | 0 | 0 | 2 | 0 | 42 | 0 | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | |
| Permitted Phases | | | | | | | 8 | | | 4 | | 4 |
| Actuated Green, G (s) | 1.0 | 37.2 | | | 31.3 | | | 6.6 | | 6.6 | | 6.6 |
| Effective Green, g (s) | 1.0 | 37.2 | | | 31.3 | | | 6.6 | | 6.6 | | 6.6 |
| Actuated g/C Ratio | 0.02 | 0.71 | | | 0.59 | | | 0.13 | | 0.13 | | 0.13 |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Grp Cap (vph) | 33 | 1309 | | | 1916 | | | 221 | | 176 | | 198 |
| v/s Ratio Prot | c0.02 | 0.15 | | | | | | | | | | |
| v/s Ratio Perm | | | | | c0.22 | | | 0.00 | | c0.03 | | 0.00 |
| v/c Ratio | 1.06 | 0.22 | | | 1.73dr | | | 0.01 | | 0.24 | | 0.01 |
| Uniform Delay, d1 | 25.9 | 2.7 | | | 5.6 | | | 20.2 | | 20.8 | | 20.2 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | | 1.00 |
| Incremental Delay, d2 | 175.6 | 0.1 | | | 0.2 | | | 0.0 | | 1.0 | | 0.0 |
| Delay (s) | 201.4 | 2.8 | | | 5.8 | | | 20.2 | | 21.7 | | 20.2 |
| Level of Service | F | A | | | A | | | C | | C | | C |
| Approach Delay (s) | | 24.5 | | | 5.8 | | | 20.2 | | | 21.2 | |
| Approach LOS | | C | | | A | | | C | | | C | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 11.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.37 | | |
| Actuated Cycle Length (s) | 52.7 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 37.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
26: Miller St & Fairway Dr/Aladdin Ave

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 31 | 306 | 31 | 72 | 757 | 203 | 12 | 1 | 12 | 39 | 2 | 18 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 0.86 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1833 | | 1593 | 1924 | | 1711 | 1550 | | 1770 | 1609 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1833 | | 1593 | 1924 | | 1801 | 1550 | | 1770 | 1609 | |
| 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) | 34 | 333 | 34 | 78 | 823 | 221 | 13 | 1 | 13 | 42 | 2 | 20 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 12 | 0 | 0 | 17 | 0 |
| Lane Group Flow (vph) | 34 | 365 | 0 | 78 | 1039 | 0 | 13 | 2 | 0 | 42 | 5 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 2.3 | 40.9 | | 5.6 | 44.2 | | 3.3 | 3.3 | | 2.5 | 9.8 | |
| Effective Green, g (s) | 2.3 | 40.9 | | 5.6 | 44.2 | | 3.3 | 3.3 | | 2.5 | 9.8 | |
| Actuated g/C Ratio | 0.03 | 0.58 | | 0.08 | 0.63 | | 0.05 | 0.05 | | 0.04 | 0.14 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 58 | 1069 | | 127 | 1213 | | 84 | 72 | | 63 | 224 | |
| v/s Ratio Prot | 0.02 | 0.20 | | c0.05 | c0.54 | | | 0.00 | | c0.02 | 0.00 | |
| v/s Ratio Perm | | | | | | | c0.01 | | | | | |
| v/c Ratio | 0.59 | 0.34 | | 0.61 | 0.86 | | 0.15 | 0.02 | | 0.67 | 0.02 | |
| Uniform Delay, d1 | 33.4 | 7.6 | | 31.2 | 10.4 | | 32.1 | 31.9 | | 33.4 | 26.0 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 9.4 | 0.3 | | 6.1 | 6.4 | | 1.2 | 0.2 | | 18.7 | 0.1 | |
| Delay (s) | 42.8 | 7.9 | | 37.3 | 16.8 | | 33.2 | 32.0 | | 52.1 | 26.1 | |
| Level of Service | D | A | | D | B | | C | C | | D | C | |
| Approach Delay (s) | | 10.8 | | | 18.2 | | | 32.6 | | | 43.1 | |
| Approach LOS | | B | | | B | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 17.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.82 | | |
| Actuated Cycle Length (s) | 70.1 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 75.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Teagarden St & Aladdin Ave

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 39 | 231 | 62 | 10 | 669 | 40 | 89 | 111 | 11 | 75 | 152 | 195 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1958 | | 1711 | 1706 | | 1652 | 1833 | | 1645 | 1740 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.34 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1958 | | 1711 | 1706 | | 585 | 1833 | | 1163 | 1740 | |
| 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) | 42 | 251 | 67 | 11 | 727 | 43 | 97 | 121 | 12 | 82 | 165 | 212 |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 66 | 0 |
| Lane Group Flow (vph) | 42 | 306 | 0 | 11 | 768 | 0 | 97 | 128 | 0 | 82 | 311 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 14 | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | | 5 | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 3.0 | 25.7 | | 1.2 | 23.9 | | 16.2 | 16.2 | | 16.2 | 16.2 | |
| Effective Green, g (s) | 3.0 | 25.7 | | 1.2 | 23.9 | | 16.2 | 16.2 | | 16.2 | 16.2 | |
| Actuated g/C Ratio | 0.05 | 0.46 | | 0.02 | 0.43 | | 0.29 | 0.29 | | 0.29 | 0.29 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 91 | 896 | | 36 | 726 | | 168 | 529 | | 335 | 502 | |
| v/s Ratio Prot | c0.02 | 0.16 | | 0.01 | c0.45 | | | 0.07 | | | c0.18 | |
| v/s Ratio Perm | | | | | | | 0.17 | | | 0.07 | | |
| v/c Ratio | 0.46 | 0.34 | | 0.31 | 1.06 | | 0.58 | 0.24 | | 0.24 | 0.62 | |
| Uniform Delay, d1 | 25.8 | 9.8 | | 27.0 | 16.1 | | 17.0 | 15.3 | | 15.3 | 17.3 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.0 | 0.3 | | 6.5 | 49.6 | | 5.7 | 0.3 | | 0.5 | 2.6 | |
| Delay (s) | 30.7 | 10.1 | | 33.5 | 65.7 | | 22.7 | 15.6 | | 15.8 | 19.9 | |
| Level of Service | C | B | | C | E | | C | B | | B | B | |
| Approach Delay (s) | | 12.5 | | | 65.3 | | | 18.6 | | | 19.2 | |
| Approach LOS | | B | | | E | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 37.5 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.85 | | |
| Actuated Cycle Length (s) | 56.1 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 73.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Alvarado St & Aladdin Ave

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|-------|------|------|------|-------|------|------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 172 | 17 | 77 | 2 | 12 | 10 | 534 | 725 | 15 | 7 | 242 | 193 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.88 | | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1547 | | 1652 | 1603 | | 1652 | 3240 | 1442 | 1711 | 3159 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1547 | | 1652 | 1603 | | 1652 | 3240 | 1442 | 1711 | 3159 | |
| 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) | 187 | 18 | 84 | 2 | 13 | 11 | 580 | 788 | 16 | 8 | 263 | 210 |
| RTOR Reduction (vph) | 0 | 62 | 0 | 0 | 9 | 0 | 0 | 0 | 7 | 0 | 121 | 0 |
| Lane Group Flow (vph) | 187 | 40 | 0 | 2 | 15 | 0 | 580 | 788 | 9 | 8 | 352 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 13.1 | 27.0 | | 0.7 | 14.6 | | 40.4 | 60.5 | 60.5 | 0.7 | 20.8 | |
| Effective Green, g (s) | 13.1 | 27.0 | | 0.7 | 14.6 | | 40.4 | 60.5 | 60.5 | 0.7 | 20.8 | |
| Actuated g/C Ratio | 0.12 | 0.26 | | 0.01 | 0.14 | | 0.38 | 0.57 | 0.57 | 0.01 | 0.20 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 205 | 396 | | 10 | 222 | | 633 | 1859 | 827 | 11 | 623 | |
| v/s Ratio Prot | c0.11 | c0.03 | | 0.00 | 0.01 | | c0.35 | 0.24 | | 0.00 | c0.11 | |
| v/s Ratio Perm | | | | | | | | | 0.01 | | | |
| v/c Ratio | 0.91 | 0.10 | | 0.20 | 0.07 | | 0.92 | 0.42 | 0.01 | 0.73 | 0.56 | |
| Uniform Delay, d1 | 45.6 | 29.9 | | 52.1 | 39.5 | | 30.9 | 12.6 | 9.6 | 52.3 | 38.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 40.8 | 0.2 | | 19.6 | 0.3 | | 18.9 | 0.3 | 0.0 | 141.7 | 1.9 | |
| Delay (s) | 86.4 | 30.2 | | 71.7 | 39.7 | | 49.8 | 13.0 | 9.6 | 194.0 | 40.1 | |
| Level of Service | F | C | | E | D | | D | B | A | F | D | |
| Approach Delay (s) | | 66.6 | | | 42.2 | | | 28.3 | | | 42.7 | |
| Approach LOS | | E | | | D | | | C | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 36.7 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.70 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.4 | | | | | | | 16.5 | | |
| Intersection Capacity Utilization | | | 69.5% | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

29: Merced Street/Merced St & Wells Fargo driveway

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↕↕ | | ↕ | ↕↕ | |
| Volume (vph) | 3 | 2 | 0 | 5 | 0 | 15 | 4 | 833 | 7 | 40 | 1032 | 5 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1808 | | | 1562 | 1397 | 1650 | 4947 | | 1617 | 3469 | |
| Flt Permitted | | 0.86 | | | 0.75 | 1.00 | 0.24 | 1.00 | | 0.30 | 1.00 | |
| Satd. Flow (perm) | | 1606 | | | 1241 | 1397 | 424 | 4947 | | 511 | 3469 | |
| 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) | 3 | 2 | 0 | 5 | 0 | 16 | 4 | 905 | 8 | 43 | 1122 | 5 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 5 | 0 | 0 | 5 | 1 | 4 | 913 | 0 | 43 | 1127 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Effective Green, g (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | 0.06 | 0.86 | 0.86 | | 0.86 | 0.86 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 103 | | | 80 | 90 | 363 | 4240 | | 438 | 2973 | |
| v/s Ratio Prot | | | | | | | | 0.18 | | | c0.32 | |
| v/s Ratio Perm | | 0.00 | | | c0.00 | 0.00 | 0.01 | | | 0.08 | | |
| v/c Ratio | | 0.05 | | | 0.06 | 0.01 | 0.01 | 0.22 | | 0.10 | 0.38 | |
| Uniform Delay, d1 | | 48.3 | | | 48.3 | 48.2 | 1.1 | 1.4 | | 1.2 | 1.7 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.28 | 0.24 | | 0.04 | 0.12 | |
| Incremental Delay, d2 | | 0.2 | | | 0.3 | 0.1 | 0.1 | 0.1 | | 0.2 | 0.2 | |
| Delay (s) | | 48.5 | | | 48.7 | 48.2 | 0.4 | 0.4 | | 0.3 | 0.4 | |
| Level of Service | | D | | | D | D | A | A | | A | A | |
| Approach Delay (s) | | 48.5 | | | 48.3 | | | 0.4 | | | 0.4 | |
| Approach LOS | | D | | | D | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 1.0 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.36 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 45.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 30: Merced Street & Republic Ave

2020 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|-------|------|------|-------|------|------|-------|---------------------------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕↕ | ↕ | ↕↕ | ↕ | ↕↕ | ↕↕ | ↕↕ | |
| Volume (vph) | 32 | 2 | 8 | 36 | 5 | 194 | 9 | 769 | 57 | 338 | 837 | 7 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | |
| Flt Protected | | 0.96 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1707 | | | 1784 | 2787 | 1736 | 3471 | 1583 | 3433 | 3466 | | |
| Flt Permitted | | 0.75 | | | 0.79 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1327 | | | 1472 | 2787 | 1736 | 3471 | 1583 | 3433 | 3466 | | |
| 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) | 35 | 2 | 9 | 39 | 5 | 211 | 10 | 836 | 62 | 367 | 910 | 8 | |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 0 | 194 | 0 | 0 | 31 | 0 | 0 | 0 | |
| Lane Group Flow (vph) | 0 | 38 | 0 | 0 | 44 | 17 | 10 | 836 | 31 | 367 | 918 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | |
| Actuated Green, G (s) | | 8.9 | | | 8.9 | 8.9 | 1.5 | 52.5 | 52.5 | 35.1 | 86.1 | | |
| Effective Green, g (s) | | 8.9 | | | 8.9 | 8.9 | 1.5 | 52.5 | 52.5 | 35.1 | 86.1 | | |
| Actuated g/C Ratio | | 0.08 | | | 0.08 | 0.08 | 0.01 | 0.48 | 0.48 | 0.32 | 0.78 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | | 107 | | | 119 | 225 | 23 | 1656 | 755 | 1095 | 2712 | | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.24 | | 0.11 | c0.26 | | |
| v/s Ratio Perm | | 0.03 | | | c0.03 | 0.01 | | | 0.02 | | | | |
| v/c Ratio | | 0.35 | | | 0.37 | 0.08 | 0.43 | 0.50 | 0.04 | 0.34 | 0.34 | | |
| Uniform Delay, d1 | | 47.8 | | | 47.9 | 46.7 | 53.8 | 19.8 | 15.3 | 28.6 | 3.5 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.40 | 0.29 | 0.02 | 0.30 | 0.18 | | |
| Incremental Delay, d2 | | 2.0 | | | 1.9 | 0.1 | 11.1 | 1.0 | 0.1 | 0.2 | 0.3 | | |
| Delay (s) | | 49.8 | | | 49.8 | 46.9 | 86.3 | 6.7 | 0.4 | 8.9 | 1.0 | | |
| Level of Service | | D | | | D | D | F | A | A | A | A | | |
| Approach Delay (s) | | 49.8 | | | 47.4 | | | 7.1 | | | 3.2 | | |
| Approach LOS | | D | | | D | | | A | | | A | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 10.0 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.44 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 51.2% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

2020 AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 14 | 4 | 30 | 817 | 566 | 55 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3195 | |
| Flt Permitted | 0.95 | 1.00 | 0.40 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 687 | 3240 | 3195 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 15 | 4 | 33 | 888 | 615 | 60 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 7 | 0 |
| Lane Group Flow (vph) | 15 | 0 | 33 | 888 | 668 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Effective Green, g (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Actuated g/C Ratio | 0.08 | 0.08 | 0.76 | 0.76 | 0.76 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 129 | 103 | 520 | 2456 | 2422 | |
| v/s Ratio Prot | c0.01 | | | c0.27 | 0.21 | |
| v/s Ratio Perm | | 0.00 | 0.05 | | | |
| v/c Ratio | 0.12 | 0.00 | 0.06 | 0.36 | 0.28 | |
| Uniform Delay, d1 | 23.6 | 23.4 | 1.7 | 2.2 | 2.0 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.08 | |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.2 | 0.4 | 0.2 | |
| Delay (s) | 24.0 | 23.4 | 1.9 | 2.6 | 0.4 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.6 | 0.4 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 1.9 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.34 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2020 PM

HCM Signalized Intersection Capacity Analysis

2020 PM

1: Doolittle Dr & Davis St

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|---------------------|------|-------|-------|------|-------|------|-------|-------|-------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 44 | 91 | 21 | 191 | 73 | 485 | 12 | 349 | 338 | 780 | 668 | 20 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3100 | | 3255 | 1689 | 1494 | 1620 | 4655 | 1435 | 3143 | 3223 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3100 | | 3255 | 1689 | 1494 | 1620 | 4655 | 1435 | 3143 | 3223 | | |
| 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) | 48 | 99 | 23 | 208 | 79 | 527 | 13 | 379 | 367 | 848 | 726 | 22 | |
| RTOR Reduction (vph) | 0 | 20 | 0 | 0 | 0 | 160 | 0 | 0 | 233 | 0 | 1 | 0 | |
| Lane Group Flow (vph) | 48 | 102 | 0 | 208 | 79 | 367 | 13 | 379 | 134 | 848 | 747 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 4.5 | 10.2 | | 10.0 | 15.7 | 43.9 | 4.3 | 18.9 | 28.9 | 28.2 | 42.8 | | |
| Effective Green, g (s) | 4.5 | 10.2 | | 10.0 | 15.7 | 43.9 | 4.3 | 18.9 | 28.9 | 28.2 | 42.8 | | |
| Actuated g/C Ratio | 0.05 | 0.12 | | 0.12 | 0.19 | 0.53 | 0.05 | 0.23 | 0.35 | 0.34 | 0.52 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 91 | 382 | | 394 | 321 | 794 | 84 | 1065 | 502 | 1073 | 1670 | | |
| v/s Ratio Prot | 0.03 | 0.03 | | c0.06 | 0.05 | c0.16 | 0.01 | c0.08 | 0.03 | c0.27 | c0.23 | | |
| v/s Ratio Perm | | | | | | 0.09 | | | 0.06 | | | | |
| v/c Ratio | 0.53 | 0.27 | | 0.53 | 0.25 | 0.46 | 0.15 | 0.36 | 0.27 | 0.79 | 0.45 | | |
| Uniform Delay, d1 | 38.0 | 32.8 | | 34.1 | 28.4 | 12.0 | 37.4 | 26.7 | 19.3 | 24.5 | 12.5 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 2.5 | 0.4 | | 0.6 | 0.4 | 0.2 | 0.3 | 0.3 | 0.1 | 3.8 | 0.3 | | |
| Delay (s) | 40.5 | 33.2 | | 34.7 | 28.8 | 12.2 | 37.7 | 27.0 | 19.4 | 28.3 | 12.8 | | |
| Level of Service | D | C | | C | C | B | D | C | B | C | B | | |
| Approach Delay (s) | | 35.3 | | | 19.5 | | | 23.5 | | | 21.0 | | |
| Approach LOS | | D | | | B | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 22.0 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.62 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 82.6 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 56.7% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

2020 PM

2: Phillips Ln & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|-------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↗ | ↖ | ↗ | | ↗ | ↗ | |
| Volume (vph) | 147 | 1128 | 20 | 19 | 599 | 420 | 53 | 13 | 274 | 477 | 3 | 132 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.86 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3170 | | 1620 | 3000 | 1328 | 1678 | 1442 | | 3143 | 1416 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.23 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3170 | | 1620 | 3000 | 1328 | 411 | 1442 | | 3143 | 1416 | |
| 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) | 160 | 1226 | 22 | 21 | 651 | 457 | 58 | 14 | 298 | 518 | 3 | 143 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 12 | 146 | 0 | 181 | 0 | 0 | 107 | 0 |
| Lane Group Flow (vph) | 160 | 1247 | 0 | 21 | 758 | 192 | 58 | 131 | 0 | 518 | 39 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 15.0 | 44.2 | | 4.4 | 33.6 | 59.8 | 17.2 | 17.2 | | 26.2 | 26.2 | |
| Effective Green, g (s) | 15.0 | 44.2 | | 4.4 | 33.6 | 59.8 | 17.2 | 17.2 | | 26.2 | 26.2 | |
| Actuated g/C Ratio | 0.14 | 0.42 | | 0.04 | 0.32 | 0.57 | 0.16 | 0.16 | | 0.25 | 0.25 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 231 | 1334 | | 67 | 960 | 756 | 67 | 236 | | 784 | 353 | |
| v/s Ratio Prot | c0.10 | c0.39 | | 0.01 | 0.25 | 0.06 | | 0.09 | | c0.16 | | |
| v/s Ratio Perm | | | | | | 0.08 | c0.14 | | | | | 0.03 |
| v/c Ratio | 0.69 | 0.93 | | 0.31 | 0.79 | 0.25 | 0.87 | 0.55 | | 0.66 | 0.11 | |
| Uniform Delay, d1 | 42.8 | 29.0 | | 48.8 | 32.5 | 11.4 | 42.8 | 40.4 | | 35.4 | 30.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.47 | 0.66 | 2.46 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.1 | 13.3 | | 0.9 | 6.1 | 0.2 | 63.3 | 1.6 | | 2.1 | 0.1 | |
| Delay (s) | 49.9 | 42.3 | | 72.8 | 27.5 | 28.1 | 106.0 | 42.0 | | 37.5 | 30.5 | |
| Level of Service | D | D | | E | C | C | F | D | | D | C | |
| Approach Delay (s) | | 43.2 | | | 28.5 | | | 52.0 | | | 36.0 | |
| Approach LOS | | D | | | C | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 38.1 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.83 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 88.1% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↖ | ↗↖↗ | | ↖↗ | ↗↖↗ | | | ↖ | ↗↖↗ | ↖ | ↗ | ↖ |
| Volume (vph) | 26 | 1544 | 267 | 378 | 875 | 97 | 156 | 23 | 437 | 64 | 23 | 26 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.91 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4469 | | 3143 | 4696 | | | 1809 | 2805 | 1562 | 1471 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.72 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4469 | | 3143 | 4696 | | | 1351 | 2805 | 1562 | 1471 | |
| 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) | 28 | 1678 | 290 | 411 | 951 | 105 | 170 | 25 | 475 | 70 | 25 | 28 |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 11 | 0 | 0 | 0 | 147 | 0 | 25 | 0 |
| Lane Group Flow (vph) | 28 | 1947 | 0 | 411 | 1045 | 0 | 0 | 195 | 328 | 70 | 28 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 7.2 | 46.8 | | 16.5 | 56.6 | | | 18.6 | 35.1 | 9.6 | 9.6 | |
| Effective Green, g (s) | 7.2 | 46.8 | | 16.5 | 56.6 | | | 18.6 | 35.1 | 9.6 | 9.6 | |
| Actuated g/C Ratio | 0.07 | 0.45 | | 0.16 | 0.54 | | | 0.18 | 0.33 | 0.09 | 0.09 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 111 | 1991 | | 493 | 2531 | | | 239 | 937 | 142 | 134 | |
| v/s Ratio Prot | 0.02 | c0.44 | | c0.13 | 0.22 | | | | 0.05 | c0.04 | 0.02 | |
| v/s Ratio Perm | | | | | | | | c0.14 | 0.06 | | | |
| v/c Ratio | 0.25 | 0.98 | | 0.83 | 0.41 | | | 0.82 | 0.35 | 0.49 | 0.21 | |
| Uniform Delay, d1 | 46.3 | 28.6 | | 42.9 | 14.4 | | | 41.6 | 26.3 | 45.4 | 44.2 | |
| Progression Factor | 0.90 | 1.10 | | 1.22 | 1.11 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.3 | 11.2 | | 8.0 | 0.4 | | | 18.0 | 0.1 | 1.0 | 0.3 | |
| Delay (s) | 41.9 | 42.6 | | 60.5 | 16.3 | | | 59.6 | 26.4 | 46.4 | 44.4 | |
| Level of Service | D | D | | E | B | | | E | C | D | D | |
| Approach Delay (s) | | 42.6 | | | 28.7 | | | 36.1 | | | 45.5 | |
| Approach LOS | | D | | | C | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 36.8 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.87 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 73.2% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: I-880 SB ramps & Davis St/Davis Street

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|--------|------|---------------------------|------|------|------|------|-------|------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 1197 | 801 | 0 | 974 | 424 | 0 | 0 | 0 | 349 | 0 | 414 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.95 | | | | | 1.00 | 0.90 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3090 | | | | | 1681 | 1471 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3090 | | | | | 1681 | 1471 | 1461 |
| 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 | 1301 | 871 | 0 | 1059 | 461 | 0 | 0 | 0 | 379 | 0 | 450 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 39 | 39 |
| Lane Group Flow (vph) | 0 | 1301 | 871 | 0 | 1482 | 0 | 0 | 0 | 0 | 288 | 237 | 226 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 61.0 | 105.0 | | 61.0 | | | | | 36.0 | 36.0 | 36.0 |
| Effective Green, g (s) | | 61.0 | 105.0 | | 61.0 | | | | | 36.0 | 36.0 | 36.0 |
| Actuated g/C Ratio | | 0.58 | 1.00 | | 0.58 | | | | | 0.34 | 0.34 | 0.34 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1912 | 1439 | | 1795 | | | | | 576 | 504 | 500 |
| v/s Ratio Prot | | 0.40 | | | 0.48 | | | | | 0.17 | 0.16 | 0.15 |
| v/s Ratio Perm | | | 0.61 | | | | | | | | | |
| v/c Ratio | | 0.68 | 0.61 | | 0.83 | | | | | 0.50 | 0.47 | 0.45 |
| Uniform Delay, d1 | | 15.2 | 0.0 | | 17.7 | | | | | 27.4 | 27.0 | 26.8 |
| Progression Factor | | 0.62 | 1.00 | | 0.70 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 1.0 | 0.4 | | 4.1 | | | | | 0.7 | 0.7 | 0.7 |
| Delay (s) | | 10.5 | 0.4 | | 16.6 | | | | | 28.0 | 27.7 | 27.5 |
| Level of Service | | B | A | | B | | | | | C | C | C |
| Approach Delay (s) | | 6.4 | | | 16.6 | | | 0.0 | | | 27.8 | |
| Approach LOS | | A | | | B | | | A | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 13.8 | | HCM 2000 Level of Service | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.77 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | | | | | 8.0 | | |
| Intersection Capacity Utilization | | | 70.6% | | ICU Level of Service | | | | | C | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

2020 PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↙↘ | ↗ |
| Volume (vph) | 1077 | 596 | 0 | 930 | 415 | 561 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Frt | 0.95 | | | 1.00 | 0.94 | 0.85 |
| Flt Protected | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3350 | | | 3539 | 3306 | 1441 |
| Flt Permitted | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3350 | | | 3539 | 3306 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1171 | 648 | 0 | 1011 | 451 | 610 |
| RTOR Reduction (vph) | 51 | 0 | 0 | 0 | 43 | 43 |
| Lane Group Flow (vph) | 1768 | 0 | 0 | 1011 | 683 | 292 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 70.1 | | | 70.1 | 27.9 | 27.9 |
| Effective Green, g (s) | 70.1 | | | 70.1 | 27.9 | 27.9 |
| Actuated g/C Ratio | 0.67 | | | 0.67 | 0.27 | 0.27 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2236 | | | 2362 | 878 | 382 |
| v/s Ratio Prot | c0.53 | | | 0.29 | c0.21 | 0.20 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.79 | | | 0.43 | 0.78 | 0.77 |
| Uniform Delay, d1 | 12.3 | | | 8.1 | 35.7 | 35.5 |
| Progression Factor | 0.47 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.5 | | | 0.6 | 4.0 | 8.0 |
| Delay (s) | 8.2 | | | 8.7 | 39.7 | 43.5 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 8.2 | | | 8.7 | 40.9 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 17.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.79 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 78.7% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2020 PM

6: Doolittle Dr & Williams St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↔ | | ↕ | ↕↔ | |
| Volume (vph) | 52 | 82 | 22 | 98 | 72 | 83 | 16 | 491 | 70 | 166 | 810 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.99 | |
| Flt Protected | | 0.98 | | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1525 | | | 1682 | 1303 | 1620 | 3011 | | 1562 | 3044 | |
| Flt Permitted | | 0.84 | | | 0.72 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1301 | | | 1252 | 1303 | 1620 | 3011 | | 1562 | 3044 | |
| 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) | 57 | 89 | 24 | 107 | 78 | 90 | 17 | 534 | 76 | 180 | 880 | 57 |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 68 | 0 | 14 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 0 | 163 | 0 | 0 | 185 | 22 | 17 | 596 | 0 | 180 | 933 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | | 14 | 5 | | 2 | 2 | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | |
| Actuated Green, G (s) | | 15.9 | | | 15.9 | 15.9 | 1.3 | 23.2 | | 13.5 | 34.9 | |
| Effective Green, g (s) | | 15.9 | | | 15.9 | 15.9 | 1.3 | 23.2 | | 13.5 | 34.9 | |
| Actuated g/C Ratio | | 0.24 | | | 0.24 | 0.24 | 0.02 | 0.35 | | 0.21 | 0.53 | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | | 314 | | | 302 | 314 | 32 | 1061 | | 320 | 1614 | |
| v/s Ratio Prot | | | | | | | 0.01 | 0.20 | | c0.12 | c0.31 | |
| v/s Ratio Perm | | 0.13 | | | c0.15 | 0.02 | | | | | | |
| v/c Ratio | | 0.52 | | | 0.61 | 0.07 | 0.53 | 0.56 | | 0.56 | 0.58 | |
| Uniform Delay, d1 | | 21.6 | | | 22.2 | 19.2 | 31.9 | 17.2 | | 23.5 | 10.5 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.9 | | | 4.2 | 0.1 | 19.9 | 0.8 | | 2.7 | 0.6 | |
| Delay (s) | | 23.6 | | | 26.4 | 19.4 | 51.9 | 18.0 | | 26.2 | 11.1 | |
| Level of Service | | C | | | C | B | D | B | | C | B | |
| Approach Delay (s) | | 23.6 | | | 24.1 | | | 18.9 | | | 13.5 | |
| Approach LOS | | C | | | C | | | B | | | B | |

Intersection Summary

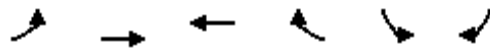
| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 17.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.62 | | |
| Actuated Cycle Length (s) | 65.8 | Sum of lost time (s) | 13.7 |
| Intersection Capacity Utilization | 56.2% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

2020 PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 50 | 422 | 226 | 280 | 350 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1555 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1555 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 54 | 459 | 246 | 304 | 380 | 58 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 154 | 0 | 22 |
| Lane Group Flow (vph) | 54 | 459 | 246 | 150 | 380 | 36 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 7.2 | 65.6 | 54.4 | 54.4 | 35.8 | 35.8 |
| Effective Green, g (s) | 7.2 | 65.6 | 54.4 | 54.4 | 35.8 | 35.8 |
| Actuated g/C Ratio | 0.07 | 0.60 | 0.49 | 0.49 | 0.33 | 0.33 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 106 | 1089 | 843 | 769 | 508 | 439 |
| v/s Ratio Prot | c0.03 | c0.25 | 0.14 | | c0.24 | |
| v/s Ratio Perm | | | | 0.10 | | 0.03 |
| v/c Ratio | 0.51 | 0.42 | 0.29 | 0.20 | 0.75 | 0.08 |
| Uniform Delay, d1 | 49.7 | 12.0 | 16.4 | 15.6 | 33.1 | 25.7 |
| Progression Factor | 1.00 | 1.00 | 1.26 | 2.88 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.4 | 1.2 | 0.8 | 0.5 | 6.0 | 0.1 |
| Delay (s) | 51.1 | 13.2 | 21.4 | 45.4 | 39.0 | 25.8 |
| Level of Service | D | B | C | D | D | C |
| Approach Delay (s) | | 17.2 | 34.7 | | 37.3 | |
| Approach LOS | | B | C | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 29.4 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.56 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 51.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2020 PM

8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBL | EBT | EBR | WBL | WBT | NBL2 | NBL | NBR | SBL | SBT | SEL | SER |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|
| Lane Configurations | | ↑ | ↗ | ↖ | ↗ | | ↘ | ↗ | | ↕ | ↘ | ↘ |
| Volume (vph) | 2 | 290 | 478 | 132 | 208 | 234 | 8 | 150 | 1 | 8 | 1 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 9 | 10 | 11 | 11 | 16 | 12 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.97 | | 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 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.85 | | 1.00 | 0.88 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | 1759 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | 1757 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| 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) | 2 | 315 | 520 | 143 | 226 | 254 | 9 | 163 | 1 | 9 | 1 | 9 |
| RTOR Reduction (vph) | 0 | 0 | 287 | 0 | 0 | 0 | 0 | 109 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 317 | 233 | 143 | 226 | 0 | 263 | 54 | 0 | 10 | 10 | 0 |
| Confl. Peds. (#/hr) | | | 14 | | | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | 7 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Turn Type | Perm | NA | Perm | Prot | NA | Prot | Prot | Perm | Split | NA | Prot | |
| Protected Phases | | 2 | | 1 | 6 | 4 | 4 | | 8 | 8 | 7 | |
| Permitted Phases | 2 | | 2 | | | | | 4 | | | | |
| Actuated Green, G (s) | | 49.2 | 49.2 | 15.0 | 68.2 | | 21.4 | 21.4 | | 1.4 | 2.4 | |
| Effective Green, g (s) | | 49.2 | 49.2 | 15.0 | 68.2 | | 21.4 | 21.4 | | 1.4 | 2.4 | |
| Actuated g/C Ratio | | 0.45 | 0.45 | 0.14 | 0.62 | | 0.19 | 0.19 | | 0.01 | 0.02 | |
| Clearance Time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 785 | 644 | 213 | 1057 | | 326 | 332 | | 23 | 34 | |
| v/s Ratio Prot | | | | c0.09 | 0.13 | | c0.16 | | | c0.01 | c0.01 | |
| v/s Ratio Perm | | c0.18 | 0.16 | | | | | 0.03 | | | | |
| v/c Ratio | | 0.40 | 0.36 | 0.67 | 0.21 | | 0.81 | 0.16 | | 0.43 | 0.29 | |
| Uniform Delay, d1 | | 20.5 | 20.0 | 45.2 | 9.2 | | 42.3 | 36.9 | | 53.9 | 53.0 | |
| Progression Factor | | 0.72 | 1.08 | 1.00 | 1.00 | | 0.81 | 0.45 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.3 | 1.3 | 8.1 | 0.5 | | 13.2 | 0.2 | | 12.6 | 4.8 | |
| Delay (s) | | 16.1 | 22.9 | 53.2 | 9.6 | | 47.5 | 16.9 | | 66.5 | 57.7 | |
| Level of Service | | B | C | D | A | | D | B | | E | E | |
| Approach Delay (s) | | 20.3 | | | 26.5 | | | | | 66.5 | 57.7 | |
| Approach LOS | | C | | | C | | | | | E | E | |

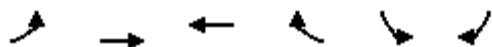
| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 26.2 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.54 | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) 20.6 |
| Intersection Capacity Utilization | 78.7% | ICU Level of Service D |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

















2020 PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|-------------|-------------|-------------|-------------|----------------------|------|
| Lane Configurations | | ↑ | ↑ | ↑ | ↑ | |
| Volume (veh/h) | 0 | 168 | 248 | 13 | 21 | 0 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 183 | 270 | 14 | 23 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 284 | | | | 452 | 270 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 284 | | | | 452 | 270 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 96 | 100 |
| cM capacity (veh/h) | 1279 | | | | 565 | 769 |
| Direction, Lane # | EB 1 | WB 1 | WB 2 | SB 1 | | |
| Volume Total | 183 | 270 | 14 | 23 | | |
| Volume Left | 0 | 0 | 0 | 23 | | |
| Volume Right | 0 | 0 | 14 | 0 | | |
| cSH | 1700 | 1700 | 1700 | 565 | | |
| Volume to Capacity | 0.11 | 0.16 | 0.01 | 0.04 | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | 3 | | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 11.6 | | |
| Lane LOS | | | | B | | |
| Approach Delay (s) | 0.0 | 0.0 | | 11.6 | | |
| Approach LOS | | | | B | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.5 | | | |
| Intersection Capacity Utilization | | | 23.1% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2020 PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 29 | 162 | 12 | 44 | 207 | 50 | 14 | 42 | 33 | 29 | 38 | 20 |
| 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 |
| Hourly flow rate (vph) | 32 | 176 | 13 | 48 | 225 | 54 | 15 | 46 | 36 | 32 | 41 | 22 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 221 | 327 | 97 | 95 | | | | | | | | |
| Volume Left (vph) | 32 | 48 | 15 | 32 | | | | | | | | |
| Volume Right (vph) | 13 | 54 | 36 | 22 | | | | | | | | |
| Hadj (s) | 0.03 | -0.04 | -0.16 | -0.04 | | | | | | | | |
| Departure Headway (s) | 4.9 | 4.7 | 5.2 | 5.3 | | | | | | | | |
| Degree Utilization, x | 0.30 | 0.42 | 0.14 | 0.14 | | | | | | | | |
| Capacity (veh/h) | 696 | 736 | 605 | 599 | | | | | | | | |
| Control Delay (s) | 9.9 | 11.1 | 9.1 | 9.2 | | | | | | | | |
| Approach Delay (s) | 9.9 | 11.1 | 9.1 | 9.2 | | | | | | | | |
| Approach LOS | A | B | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.2 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 37.8% | ICU Level of Service | | | | | | | | A |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2020 PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 50 | 181 | 30 | 223 | 245 | 205 | 16 | 338 | 187 | 279 | 686 | 90 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 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 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1448 | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 3021 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1448 | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 3021 | |
| 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) | 54 | 197 | 33 | 242 | 266 | 223 | 17 | 367 | 203 | 303 | 746 | 98 |
| RTOR Reduction (vph) | 0 | 0 | 27 | 0 | 0 | 155 | 0 | 0 | 151 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 54 | 197 | 6 | 242 | 266 | 68 | 17 | 367 | 52 | 303 | 838 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 8.3 | 19.7 | 19.7 | 21.5 | 32.9 | 32.9 | 3.0 | 22.4 | 22.4 | 25.9 | 45.3 | |
| Effective Green, g (s) | 8.3 | 19.7 | 19.7 | 21.5 | 32.9 | 32.9 | 3.0 | 22.4 | 22.4 | 25.9 | 45.3 | |
| Actuated g/C Ratio | 0.08 | 0.18 | 0.18 | 0.20 | 0.31 | 0.31 | 0.03 | 0.21 | 0.21 | 0.24 | 0.42 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 127 | 318 | 265 | 324 | 532 | 427 | 46 | 675 | 277 | 390 | 1273 | |
| v/s Ratio Prot | 0.03 | c0.11 | | c0.15 | 0.15 | | 0.01 | 0.11 | | c0.19 | c0.28 | |
| v/s Ratio Perm | | | 0.00 | | | 0.05 | | | 0.04 | | | |
| v/c Ratio | 0.43 | 0.62 | 0.02 | 0.75 | 0.50 | 0.16 | 0.37 | 0.54 | 0.19 | 0.78 | 0.66 | |
| Uniform Delay, d1 | 47.3 | 40.4 | 36.0 | 40.4 | 30.6 | 27.2 | 51.3 | 38.0 | 35.0 | 38.1 | 24.9 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.1 | 4.1 | 0.0 | 9.6 | 1.0 | 0.2 | 6.7 | 1.1 | 0.4 | 9.9 | 1.4 | |
| Delay (s) | 50.4 | 44.5 | 36.1 | 50.1 | 31.6 | 27.5 | 58.0 | 39.1 | 35.5 | 48.0 | 26.3 | |
| Level of Service | D | D | D | D | C | C | E | D | D | D | C | |
| Approach Delay (s) | | 44.7 | | | 36.4 | | | 38.4 | | | 32.0 | |
| Approach LOS | | D | | | D | | | D | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 35.9 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.72 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 107.5 | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 62.7% | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: Merced St & Marina Blvd

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|-------|-------|------|------|
| Lane Configurations | ↘ | ↗↔↘ | | ↘↗ | ↗↔ | | ↘ | ↗↔ | ↗↔↘ | ↘↗ | ↗↔ | ↗ |
| Volume (vph) | 52 | 712 | 75 | 774 | 634 | 134 | 72 | 237 | 969 | 323 | 315 | 39 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4588 | | 3255 | 3146 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1474 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4588 | | 3255 | 3146 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1474 |
| 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) | 57 | 774 | 82 | 841 | 689 | 146 | 78 | 258 | 1053 | 351 | 342 | 42 |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| Lane Group Flow (vph) | 57 | 844 | 0 | 841 | 819 | 0 | 78 | 258 | 1053 | 351 | 342 | 11 |
| Confl. Peds. (#/hr) | | | | | | | 3 | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 10.0 | 24.0 | | 29.0 | 43.0 | | 10.0 | 25.0 | 58.0 | 13.0 | 28.0 | 28.0 |
| Effective Green, g (s) | 10.0 | 25.5 | | 29.0 | 44.5 | | 10.0 | 26.5 | 58.0 | 13.0 | 29.5 | 29.5 |
| Actuated g/C Ratio | 0.09 | 0.23 | | 0.26 | 0.40 | | 0.09 | 0.24 | 0.53 | 0.12 | 0.27 | 0.27 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 142 | 1063 | | 858 | 1272 | | 152 | 808 | 1426 | 384 | 868 | 395 |
| v/s Ratio Prot | 0.04 | c0.18 | | c0.26 | 0.26 | | 0.05 | 0.08 | c0.39 | c0.11 | 0.11 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 |
| v/c Ratio | 0.40 | 0.79 | | 0.98 | 0.64 | | 0.51 | 0.32 | 0.74 | 0.91 | 0.39 | 0.03 |
| Uniform Delay, d1 | 47.2 | 39.8 | | 40.2 | 26.4 | | 47.7 | 34.3 | 20.1 | 47.9 | 32.9 | 29.7 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.81 | 0.78 | 0.65 | 1.01 | 0.99 | 1.00 |
| Incremental Delay, d2 | 2.5 | 6.1 | | 26.3 | 2.5 | | 11.4 | 0.3 | 2.1 | 28.3 | 0.4 | 0.0 |
| Delay (s) | 49.7 | 45.9 | | 66.5 | 28.9 | | 50.0 | 27.2 | 15.1 | 76.7 | 33.0 | 29.7 |
| Level of Service | D | D | | E | C | | D | C | B | E | C | C |
| Approach Delay (s) | | 46.2 | | | 47.8 | | | 19.3 | | | 53.7 | |
| Approach LOS | | D | | | D | | | B | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 40.0 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.87 | D |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 80.9% | 17.5 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | D |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2020 PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑↑↑ | | ↵ | ↑↑ | | ↵ |
| Volume (vph) | 2101 | 68 | 310 | 0 | 0 | 542 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 1.00 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6378 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6378 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 2284 | 74 | 337 | 0 | 0 | 589 |
| RTOR Reduction (vph) | 6 | 0 | 0 | 0 | 0 | 1 |
| Lane Group Flow (vph) | 2352 | 0 | 337 | 0 | 0 | 588 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 33.5 | | 26.6 | | | 26.6 |
| Effective Green, g (s) | 33.5 | | 26.6 | | | 26.6 |
| Actuated g/C Ratio | 0.48 | | 0.38 | | | 0.38 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 3069 | | 676 | | | 615 |
| v/s Ratio Prot | c0.37 | | 0.19 | | | c0.37 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.77 | | 0.50 | | | 0.96 |
| Uniform Delay, d1 | 14.8 | | 16.4 | | | 20.9 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 1.2 | | 0.6 | | | 25.7 |
| Delay (s) | 16.0 | | 17.0 | | | 46.6 |
| Level of Service | B | | B | | | D |
| Approach Delay (s) | 16.0 | | | 17.0 | 46.6 | |
| Approach LOS | B | | | B | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 21.6 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.85 | | |
| Actuated Cycle Length (s) | 69.6 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 73.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020 PM



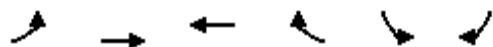
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|-------|------|------|------|------|------|-------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1676 | 758 | 408 | 862 | 0 | 0 | 0 | 547 | 0 | 0 | 1008 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1822 | 824 | 443 | 937 | 0 | 0 | 0 | 595 | 0 | 0 | 1096 | |
| RTOR Reduction (vph) | 0 | 0 | 227 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 247 | |
| Lane Group Flow (vph) | 0 | 1822 | 597 | 443 | 937 | 0 | 0 | 0 | 595 | 0 | 0 | 849 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 79.5 | 79.5 | 18.5 | 105.0 | | | | 38.5 | | | 38.5 | |
| Effective Green, g (s) | | 79.5 | 79.5 | 18.5 | 105.0 | | | | 38.5 | | | 38.5 | |
| Actuated g/C Ratio | | 0.53 | 0.53 | 0.12 | 0.70 | | | | 0.26 | | | 0.26 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1778 | 1400 | 387 | 2348 | | | | 748 | | | 715 | |
| v/s Ratio Prot | | c0.54 | | c0.14 | 0.28 | | | | 0.20 | | | c0.30 | |
| v/s Ratio Perm | | | 0.23 | | | | | | | | | | |
| v/c Ratio | | 1.02 | 0.43 | 1.14 | 0.40 | | | | 0.80 | | | 1.19 | |
| Uniform Delay, d1 | | 35.2 | 21.4 | 65.8 | 9.4 | | | | 52.1 | | | 55.8 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 27.9 | 0.2 | 91.3 | 0.1 | | | | 5.9 | | | 98.2 | |
| Delay (s) | | 63.1 | 21.6 | 157.1 | 9.5 | | | | 57.9 | | | 153.9 | |
| Level of Service | | E | C | F | A | | | | E | | | F | |
| Approach Delay (s) | | 50.2 | | | 56.9 | | | 57.9 | | | 153.9 | | |
| Approach LOS | | D | | | E | | | E | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 72.5 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 1.09 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 150.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 73.0% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps

2020 PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|-------|------|-------|-------|---------------------------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 638 | 0 | 752 | 502 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 693 | 0 | 817 | 546 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 108 | 0 | 0 |
| Lane Group Flow (vph) | 693 | 0 | 817 | 438 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 29.9 | | 22.9 | 22.9 | | |
| Effective Green, g (s) | 29.9 | | 22.9 | 22.9 | | |
| Actuated g/C Ratio | 0.48 | | 0.37 | 0.37 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 783 | | 1243 | 567 | | |
| v/s Ratio Prot | c0.43 | | 0.24 | | | |
| v/s Ratio Perm | | | | c0.29 | | |
| v/c Ratio | 0.89 | | 0.66 | 0.77 | | |
| Uniform Delay, d1 | 14.4 | | 16.2 | 17.1 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 11.7 | | 1.3 | 6.5 | | |
| Delay (s) | 26.1 | | 17.5 | 23.6 | | |
| Level of Service | C | | B | C | | |
| Approach Delay (s) | | 26.1 | 19.9 | | 0.0 | |
| Approach LOS | | C | B | | A | |
| Intersection Summary | | | | | | |
| HCM 2000 Control Delay | | | 22.0 | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.84 | | | |
| Actuated Cycle Length (s) | | | 61.8 | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 73.9% | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | |
| c Critical Lane Group | | | | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | ↘ | ↑↑↑ | ↗ | ↘ | ↑↑↑ | | ↘ | ↗ | ↗ | | ↗ | ↗ |
| Volume (vph) | 236 | 1394 | 283 | 151 | 656 | 19 | 365 | 23 | 108 | 16 | 48 | 57 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4631 | | 1539 | 1551 | 1514 | | 1745 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4631 | | 1539 | 1551 | 1514 | | 1745 | 1489 |
| 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) | 257 | 1515 | 308 | 164 | 713 | 21 | 397 | 25 | 117 | 17 | 52 | 62 |
| RTOR Reduction (vph) | 0 | 0 | 167 | 0 | 3 | 0 | 0 | 0 | 93 | 0 | 0 | 60 |
| Lane Group Flow (vph) | 257 | 1515 | 141 | 164 | 731 | 0 | 210 | 212 | 24 | 0 | 69 | 2 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 20.5 | 45.9 | 45.9 | 10.0 | 35.4 | | 20.9 | 20.9 | 20.9 | | 4.0 | 4.0 |
| Effective Green, g (s) | 20.5 | 45.9 | 45.9 | 10.0 | 35.4 | | 20.9 | 20.9 | 20.9 | | 4.0 | 4.0 |
| Actuated g/C Ratio | 0.20 | 0.46 | 0.46 | 0.10 | 0.35 | | 0.21 | 0.21 | 0.21 | | 0.04 | 0.04 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 332 | 2136 | 702 | 167 | 1639 | | 321 | 324 | 316 | | 69 | 59 |
| v/s Ratio Prot | 0.16 | c0.33 | | c0.10 | 0.16 | | 0.14 | c0.14 | | | c0.04 | 0.00 |
| v/s Ratio Perm | | | 0.09 | | | | | | 0.02 | | | |
| v/c Ratio | 0.77 | 0.71 | 0.20 | 0.98 | 0.45 | | 0.65 | 0.65 | 0.08 | | 1.00 | 0.04 |
| Uniform Delay, d1 | 37.6 | 21.7 | 16.1 | 44.9 | 24.8 | | 36.2 | 36.2 | 31.8 | | 48.0 | 46.2 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.85 | 0.85 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 11.3 | 2.0 | 0.6 | 63.2 | 0.9 | | 5.2 | 5.2 | 0.1 | | 108.3 | 0.4 |
| Delay (s) | 48.9 | 23.7 | 16.8 | 101.4 | 21.8 | | 41.5 | 41.4 | 31.9 | | 156.3 | 46.6 |
| Level of Service | D | C | B | F | C | | D | D | C | | F | D |
| Approach Delay (s) | | 25.8 | | | 36.4 | | | 39.4 | | | 104.4 | |
| Approach LOS | | C | | | D | | | D | | | F | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 33.2 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.74 | C |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 65.4% | ICU Level of Service |
| Analysis Period (min) | 15 | C |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|-------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 62 | 1295 | 143 | 179 | 477 | 19 | 154 | 125 | 564 | 34 | 117 | 74 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3267 | | 3143 | 3240 | 1660 | 3204 | 3026 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3267 | | 3143 | 3240 | 1660 | 3204 | 3026 | |
| 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) | 67 | 1408 | 155 | 195 | 518 | 21 | 167 | 136 | 613 | 37 | 127 | 80 |
| RTOR Reduction (vph) | 0 | 0 | 92 | 0 | 3 | 0 | 0 | 0 | 165 | 0 | 70 | 0 |
| Lane Group Flow (vph) | 67 | 1408 | 63 | 195 | 536 | 0 | 167 | 136 | 448 | 37 | 137 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 7.1 | 40.4 | 40.4 | 12.0 | 45.3 | | 18.0 | 27.2 | 27.2 | 2.4 | 12.0 | |
| Effective Green, g (s) | 7.1 | 40.4 | 40.4 | 12.0 | 45.3 | | 18.0 | 27.2 | 27.2 | 2.4 | 12.0 | |
| Actuated g/C Ratio | 0.07 | 0.40 | 0.40 | 0.12 | 0.45 | | 0.18 | 0.27 | 0.27 | 0.02 | 0.12 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 115 | 1334 | 606 | 198 | 1479 | | 565 | 881 | 451 | 76 | 363 | |
| v/s Ratio Prot | 0.04 | c0.43 | | c0.12 | 0.16 | | 0.05 | 0.04 | | 0.01 | c0.05 | |
| v/s Ratio Perm | | | 0.04 | | | | | | c0.27 | | | |
| v/c Ratio | 0.58 | 1.06 | 0.10 | 0.98 | 0.36 | | 0.30 | 0.15 | 0.99 | 0.49 | 0.38 | |
| Uniform Delay, d1 | 45.0 | 29.8 | 18.5 | 43.9 | 17.9 | | 35.5 | 27.7 | 36.3 | 48.2 | 40.6 | |
| Progression Factor | 1.45 | 0.42 | 0.09 | 1.10 | 0.43 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.6 | 37.6 | 0.3 | 15.7 | 0.1 | | 0.4 | 0.1 | 40.7 | 6.6 | 0.9 | |
| Delay (s) | 69.0 | 50.2 | 1.8 | 64.0 | 7.8 | | 35.9 | 27.8 | 77.0 | 54.7 | 41.4 | |
| Level of Service | E | D | A | E | A | | D | C | E | D | D | |
| Approach Delay (s) | | 46.4 | | | 22.7 | | | 62.2 | | | 43.5 | |
| Approach LOS | | D | | | C | | | E | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 45.4 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 1.01 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 85.9% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|-------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 792 | 594 | 507 | 4 | 213 | 38 | 215 | 746 | 14 | 65 | 933 | 268 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1737 | 1477 | 1652 | 3528 | | 1652 | 3179 | |
| Flt Permitted | 0.28 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 486 | 1739 | 1770 | | 1718 | 1477 | 1652 | 3528 | | 1652 | 3179 | |
| 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) | 861 | 646 | 551 | 4 | 232 | 41 | 234 | 811 | 15 | 71 | 1014 | 291 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 1 | 0 | 0 | 25 | 0 |
| Lane Group Flow (vph) | 861 | 646 | 551 | 0 | 236 | 8 | 234 | 825 | 0 | 71 | 1280 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 42.1 | 42.1 | 100.0 | | 18.6 | 18.6 | 17.2 | 35.7 | | 7.7 | 25.7 | |
| Effective Green, g (s) | 42.1 | 42.1 | 100.0 | | 18.6 | 18.6 | 17.2 | 35.7 | | 7.7 | 25.7 | |
| Actuated g/C Ratio | 0.42 | 0.42 | 1.00 | | 0.19 | 0.19 | 0.17 | 0.36 | | 0.08 | 0.26 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 431 | 732 | 1770 | | 319 | 274 | 284 | 1259 | | 127 | 817 | |
| v/s Ratio Prot | c0.39 | 0.37 | | | | | c0.14 | 0.23 | | 0.04 | c0.40 | |
| v/s Ratio Perm | c0.45 | | 0.31 | | 0.14 | 0.01 | | | | | | |
| v/c Ratio | 2.00 | 0.88 | 0.31 | | 0.74 | 0.03 | 0.82 | 0.66 | | 0.56 | 1.57 | |
| Uniform Delay, d1 | 24.5 | 26.7 | 0.0 | | 38.4 | 33.3 | 39.9 | 27.0 | | 44.5 | 37.1 | |
| Progression Factor | 0.94 | 0.54 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 450.9 | 3.3 | 0.1 | | 9.2 | 0.1 | 17.3 | 2.7 | | 5.3 | 260.8 | |
| Delay (s) | 474.0 | 17.7 | 0.1 | | 47.7 | 33.4 | 57.3 | 29.7 | | 49.8 | 298.0 | |
| Level of Service | F | B | A | | D | C | E | C | | D | F | |
| Approach Delay (s) | | 203.9 | | | 45.5 | | | 35.7 | | | 285.2 | |
| Approach LOS | | F | | | D | | | D | | | F | |

| Intersection Summary | | | |
|-----------------------------------|--------|---------------------------|------|
| HCM 2000 Control Delay | 180.8 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.67 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 121.1% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

19: Monarch Bay Drive & Mulford Point Drive

2020 PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 61 | 26 | 38 | 82 | 149 | 57 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 66 | 28 | 41 | 89 | 162 | 62 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 95 | 130 | 224 | | | |
| Volume Left (vph) | 66 | 41 | 0 | | | |
| Volume Right (vph) | 28 | 0 | 62 | | | |
| Hadj (s) | -0.01 | 0.10 | -0.13 | | | |
| Departure Headway (s) | 4.7 | 4.5 | 4.1 | | | |
| Degree Utilization, x | 0.12 | 0.16 | 0.26 | | | |
| Capacity (veh/h) | 711 | 778 | 846 | | | |
| Control Delay (s) | 8.3 | 8.3 | 8.6 | | | |
| Approach Delay (s) | 8.3 | 8.3 | 8.6 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.5 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 32.7% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

2020 PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 9 | 4 | 6 | 112 | 111 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 10 | 4 | 7 | 122 | 121 | 21 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 14 | 128 | 141 | | | |
| Volume Left (vph) | 10 | 7 | 0 | | | |
| Volume Right (vph) | 4 | 0 | 21 | | | |
| Hadj (s) | -0.01 | 0.04 | -0.05 | | | |
| Departure Headway (s) | 4.5 | 4.1 | 4.0 | | | |
| Degree Utilization, x | 0.02 | 0.15 | 0.16 | | | |
| Capacity (veh/h) | 748 | 858 | 888 | | | |
| Control Delay (s) | 7.5 | 7.8 | 7.7 | | | |
| Approach Delay (s) | 7.5 | 7.8 | 7.7 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.8 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 20.8% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Signalized Intersection Capacity Analysis

21: Monarch Bay Drive & Fairway Drive

2020 PM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Volume (vph) | 38 | 56 | 64 | 62 | 42 | 71 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Util. Factor | 1.00 | | 1.00 | | | 1.00 |
| Frt | 0.92 | | 0.93 | | | 1.00 |
| Flt Protected | 0.98 | | 1.00 | | | 0.98 |
| Satd. Flow (prot) | 1679 | | 1740 | | | 1829 |
| Flt Permitted | 0.98 | | 1.00 | | | 0.87 |
| Satd. Flow (perm) | 1679 | | 1740 | | | 1625 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 41 | 61 | 70 | 67 | 46 | 77 |
| RTOR Reduction (vph) | 37 | 0 | 40 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 65 | 0 | 97 | 0 | 0 | 123 |
| Turn Type | Prot | | NA | | Perm | NA |
| Protected Phases | 8 | | 2 | | | 6 |
| Permitted Phases | | | | | 6 | |
| Actuated Green, G (s) | 18.0 | | 18.0 | | | 18.0 |
| Effective Green, g (s) | 18.0 | | 18.0 | | | 18.0 |
| Actuated g/C Ratio | 0.40 | | 0.40 | | | 0.40 |
| Clearance Time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Grp Cap (vph) | 671 | | 696 | | | 650 |
| v/s Ratio Prot | c0.04 | | 0.06 | | | |
| v/s Ratio Perm | | | | | | c0.08 |
| v/c Ratio | 0.10 | | 0.14 | | | 0.19 |
| Uniform Delay, d1 | 8.4 | | 8.6 | | | 8.8 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.3 | | 0.4 | | | 0.6 |
| Delay (s) | 8.7 | | 9.0 | | | 9.4 |
| Level of Service | A | | A | | | A |
| Approach Delay (s) | 8.7 | | 9.0 | | | 9.4 |
| Approach LOS | A | | A | | | A |


















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 9.1 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.14 | | |
| Actuated Cycle Length (s) | 45.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 30.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2020 PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 9 | 122 | 12 | 31 | 140 | 42 | 10 | 21 | 22 | 36 | 24 | 24 |
| 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 |
| Hourly flow rate (vph) | 10 | 133 | 13 | 34 | 152 | 46 | 11 | 23 | 24 | 39 | 26 | 26 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 10 | 146 | 232 | 58 | 91 | | | | | | | |
| Volume Left (vph) | 10 | 0 | 34 | 11 | 39 | | | | | | | |
| Volume Right (vph) | 0 | 13 | 46 | 24 | 26 | | | | | | | |
| Hadj (s) | 0.53 | -0.03 | -0.06 | -0.18 | -0.05 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.0 | 4.5 | 4.8 | 4.8 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.20 | 0.29 | 0.08 | 0.12 | | | | | | | |
| Capacity (veh/h) | 619 | 684 | 763 | 687 | 680 | | | | | | | |
| Control Delay (s) | 7.5 | 8.1 | 9.4 | 8.2 | 8.5 | | | | | | | |
| Approach Delay (s) | 8.1 | | 9.4 | 8.2 | 8.5 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.7 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 38.2% | ICU Level of Service | | | | | | | | A |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
23: Doolittle Dr & Fairway Drive/Fairway Dr

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 39 | 116 | 61 | 122 | 96 | 182 | 44 | 334 | 156 | 187 | 588 | 70 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 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 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1714 | 1259 | 1620 | 1739 | 1316 | 1711 | 2909 | | 1620 | 3026 | |
| Flt Permitted | | 0.90 | 1.00 | 0.65 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1561 | 1259 | 1110 | 1739 | 1316 | 1711 | 2909 | | 1620 | 3026 | |
| 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) | 42 | 126 | 66 | 133 | 104 | 198 | 48 | 363 | 170 | 203 | 639 | 76 |
| RTOR Reduction (vph) | 0 | 0 | 50 | 0 | 0 | 150 | 0 | 74 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 0 | 168 | 16 | 133 | 104 | 48 | 48 | 459 | 0 | 203 | 705 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 2.8 | 18.6 | | 9.8 | 25.6 | |
| Effective Green, g (s) | | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 2.8 | 18.6 | | 9.8 | 25.6 | |
| Actuated g/C Ratio | | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.05 | 0.33 | | 0.17 | 0.45 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 376 | 303 | 267 | 419 | 317 | 83 | 945 | | 277 | 1354 | |
| v/s Ratio Prot | | | | | 0.06 | | 0.03 | 0.16 | | c0.13 | c0.23 | |
| v/s Ratio Perm | | 0.11 | 0.01 | c0.12 | | 0.04 | | | | | | |
| v/c Ratio | | 0.45 | 0.05 | 0.50 | 0.25 | 0.15 | 0.58 | 0.49 | | 0.73 | 0.52 | |
| Uniform Delay, d1 | | 18.5 | 16.7 | 18.7 | 17.5 | 17.1 | 26.6 | 15.5 | | 22.5 | 11.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.8 | 0.1 | 1.5 | 0.3 | 0.2 | 9.4 | 0.5 | | 9.6 | 0.5 | |
| Delay (s) | | 19.3 | 16.7 | 20.2 | 17.8 | 17.3 | 36.0 | 16.0 | | 32.1 | 11.9 | |
| Level of Service | | B | B | C | B | B | D | B | | C | B | |
| Approach Delay (s) | | 18.6 | | | 18.3 | | | 17.7 | | | 16.3 | |
| Approach LOS | | B | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 17.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.59 | | |
| Actuated Cycle Length (s) | 57.2 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 53.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 192 | 304 | 112 | 112 | 229 | 73 | 93 | 509 | 121 | 128 | 652 | 111 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3131 | | 1593 | 3152 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3131 | | 1593 | 3152 | |
| 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) | 209 | 330 | 122 | 122 | 249 | 79 | 101 | 553 | 132 | 139 | 709 | 121 |
| RTOR Reduction (vph) | 0 | 0 | 90 | 0 | 0 | 63 | 0 | 18 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 209 | 330 | 32 | 122 | 249 | 16 | 101 | 667 | 0 | 139 | 817 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 19.0 | 28.7 | 28.7 | 12.3 | 22.0 | 22.0 | 13.1 | 36.5 | | 13.5 | 36.9 | |
| Effective Green, g (s) | 19.0 | 28.7 | 28.7 | 12.3 | 22.0 | 22.0 | 13.1 | 36.5 | | 13.5 | 36.9 | |
| Actuated g/C Ratio | 0.17 | 0.26 | 0.26 | 0.11 | 0.20 | 0.20 | 0.12 | 0.33 | | 0.12 | 0.34 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 272 | 481 | 340 | 178 | 372 | 270 | 196 | 1038 | | 195 | 1057 | |
| v/s Ratio Prot | 0.13 | c0.18 | | 0.08 | c0.13 | | 0.06 | c0.21 | | 0.09 | c0.26 | |
| v/s Ratio Perm | | | 0.02 | | | 0.01 | | | | | | |
| v/c Ratio | 0.77 | 0.69 | 0.09 | 0.69 | 0.67 | 0.06 | 0.52 | 0.64 | | 0.71 | 0.77 | |
| Uniform Delay, d1 | 43.4 | 36.6 | 30.8 | 47.0 | 40.6 | 35.6 | 45.5 | 31.2 | | 46.4 | 32.8 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.93 | | 0.97 | 0.41 | |
| Incremental Delay, d2 | 13.0 | 4.4 | 0.2 | 11.3 | 5.0 | 0.1 | 2.9 | 3.0 | | 11.7 | 5.2 | |
| Delay (s) | 56.4 | 41.0 | 31.0 | 58.3 | 45.6 | 35.7 | 46.0 | 32.1 | | 56.6 | 18.5 | |
| Level of Service | E | D | C | E | D | D | D | C | | E | B | |
| Approach Delay (s) | | 44.0 | | | 47.3 | | | 33.9 | | | 24.0 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 35.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.75 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 71.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|--------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 32 | 469 | 3 | 6 | 310 | 75 | 10 | 0 | 7 | 219 | 0 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | | 1.00 |
| Frt | 1.00 | 1.00 | | | 0.97 | | | 0.94 | | 1.00 | | 0.85 |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.97 | | 0.95 | | 1.00 |
| Satd. Flow (prot) | 1770 | 1861 | | | 3434 | | | 1707 | | 1770 | | 1583 |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.97 | | 0.75 | | 1.00 |
| Satd. Flow (perm) | 1770 | 1861 | | | 3256 | | | 1707 | | 1388 | | 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) | 35 | 510 | 3 | 7 | 337 | 82 | 11 | 0 | 8 | 238 | 0 | 64 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 14 | 0 | 0 | 0 | 46 |
| Lane Group Flow (vph) | 35 | 513 | 0 | 0 | 392 | 0 | 0 | 5 | 0 | 238 | 0 | 18 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | |
| Permitted Phases | | | | | | | 8 | | | 4 | | 4 |
| Actuated Green, G (s) | 1.1 | 30.2 | | | 24.2 | | | 15.0 | | 15.0 | | 15.0 |
| Effective Green, g (s) | 1.1 | 30.2 | | | 24.2 | | | 15.0 | | 15.0 | | 15.0 |
| Actuated g/C Ratio | 0.02 | 0.56 | | | 0.45 | | | 0.28 | | 0.28 | | 0.28 |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Grp Cap (vph) | 35 | 1038 | | | 1456 | | | 473 | | 384 | | 438 |
| v/s Ratio Prot | 0.02 | c0.28 | | | | | | | | | | |
| v/s Ratio Perm | | | | | 0.12 | | | 0.00 | | c0.17 | | 0.01 |
| v/c Ratio | 1.00 | 0.49 | | | 1.32dr | | | 0.01 | | 0.62 | | 0.04 |
| Uniform Delay, d1 | 26.5 | 7.3 | | | 9.4 | | | 14.2 | | 17.1 | | 14.3 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | | 1.00 |
| Incremental Delay, d2 | 152.1 | 0.5 | | | 0.1 | | | 0.0 | | 3.4 | | 0.1 |
| Delay (s) | 178.6 | 7.8 | | | 9.5 | | | 14.2 | | 20.5 | | 14.3 |
| Level of Service | F | A | | | A | | | B | | C | | B |
| Approach Delay (s) | | 18.7 | | | 9.5 | | | 14.2 | | | 19.2 | |
| Approach LOS | | B | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 15.7 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.60 | | |
| Actuated Cycle Length (s) | 54.1 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 52.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
26: Miller St & Fairway Dr/Aladdin Ave

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | |
| Volume (vph) | 32 | 635 | 13 | 18 | 415 | 75 | 68 | 2 | 57 | 220 | 2 | 58 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1856 | | 1593 | 1941 | | 1711 | 1539 | | 1770 | 1592 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.71 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1856 | | 1593 | 1941 | | 1287 | 1539 | | 1770 | 1592 | |
| 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) | 35 | 690 | 14 | 20 | 451 | 82 | 74 | 2 | 62 | 239 | 2 | 63 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 55 | 0 | 0 | 42 | 0 |
| Lane Group Flow (vph) | 35 | 703 | 0 | 20 | 527 | 0 | 74 | 9 | 0 | 239 | 23 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 4.0 | 38.9 | | 2.4 | 37.3 | | 9.3 | 9.3 | | 14.5 | 27.8 | |
| Effective Green, g (s) | 4.0 | 38.9 | | 2.4 | 37.3 | | 9.3 | 9.3 | | 14.5 | 27.8 | |
| Actuated g/C Ratio | 0.05 | 0.47 | | 0.03 | 0.45 | | 0.11 | 0.11 | | 0.17 | 0.34 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 85 | 870 | | 46 | 873 | | 144 | 172 | | 309 | 533 | |
| v/s Ratio Prot | c0.02 | c0.38 | | 0.01 | 0.27 | | | 0.01 | | c0.14 | 0.01 | |
| v/s Ratio Perm | | | | | | | c0.06 | | | | | |
| v/c Ratio | 0.41 | 0.81 | | 0.43 | 0.60 | | 0.51 | 0.05 | | 0.77 | 0.04 | |
| Uniform Delay, d1 | 38.3 | 18.8 | | 39.6 | 17.2 | | 34.7 | 32.9 | | 32.6 | 18.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.2 | 5.9 | | 2.4 | 1.4 | | 4.1 | 0.2 | | 10.5 | 0.0 | |
| Delay (s) | 39.5 | 24.7 | | 42.0 | 18.6 | | 38.7 | 33.0 | | 43.1 | 18.6 | |
| Level of Service | D | C | | D | B | | D | C | | D | B | |
| Approach Delay (s) | | 25.4 | | | 19.4 | | | 36.1 | | | 37.9 | |
| Approach LOS | | C | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 26.5 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.75 | | |
| Actuated Cycle Length (s) | 82.9 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 60.5% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Teagarden St & Aladdin Ave

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 100 | 771 | 147 | 2 | 286 | 64 | 40 | 101 | 11 | 36 | 204 | 122 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1976 | | 1711 | 1663 | | 1652 | 1831 | | 1644 | 1793 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.33 | 1.00 | | 0.68 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1976 | | 1711 | 1663 | | 582 | 1831 | | 1174 | 1793 | |
| 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) | 109 | 838 | 160 | 2 | 311 | 70 | 43 | 110 | 12 | 39 | 222 | 133 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 11 | 0 | 0 | 6 | 0 | 0 | 31 | 0 |
| Lane Group Flow (vph) | 109 | 990 | 0 | 2 | 370 | 0 | 43 | 116 | 0 | 39 | 324 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 8.4 | 30.7 | | 1.1 | 23.4 | | 16.7 | 16.7 | | 16.7 | 16.7 | |
| Effective Green, g (s) | 8.4 | 30.7 | | 1.1 | 23.4 | | 16.7 | 16.7 | | 16.7 | 16.7 | |
| Actuated g/C Ratio | 0.14 | 0.50 | | 0.02 | 0.38 | | 0.27 | 0.27 | | 0.27 | 0.27 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 233 | 986 | | 30 | 632 | | 158 | 497 | | 318 | 486 | |
| v/s Ratio Prot | c0.06 | c0.50 | | 0.00 | 0.22 | | | 0.06 | | | c0.18 | |
| v/s Ratio Perm | | | | | | | 0.07 | | | 0.03 | | |
| v/c Ratio | 0.47 | 1.00 | | 0.07 | 0.59 | | 0.27 | 0.23 | | 0.12 | 0.67 | |
| Uniform Delay, d1 | 24.5 | 15.4 | | 29.7 | 15.2 | | 17.6 | 17.4 | | 16.9 | 19.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.0 | 29.6 | | 1.3 | 1.6 | | 1.3 | 0.3 | | 0.2 | 3.8 | |
| Delay (s) | 26.5 | 45.0 | | 31.0 | 16.8 | | 18.9 | 17.8 | | 17.1 | 23.7 | |
| Level of Service | C | D | | C | B | | B | B | | B | C | |
| Approach Delay (s) | | 43.2 | | | 16.9 | | | 18.1 | | | 23.0 | |
| Approach LOS | | D | | | B | | | B | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 32.4 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.89 | | |
| Actuated Cycle Length (s) | 61.5 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 90.6% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 311 | 4 | 543 | 16 | 5 | 12 | 199 | 402 | 1 | 3 | 452 | 87 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | | 1.00 | 0.89 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1500 | | 1652 | 1529 | | 1652 | 3240 | 1450 | 1711 | 3284 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1500 | | 1652 | 1529 | | 1652 | 3240 | 1450 | 1711 | 3284 | |
| 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) | 338 | 4 | 590 | 17 | 5 | 13 | 216 | 437 | 1 | 3 | 491 | 95 |
| RTOR Reduction (vph) | 0 | 200 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | 0 | 17 | 0 |
| Lane Group Flow (vph) | 338 | 394 | 0 | 17 | 8 | 0 | 216 | 437 | 0 | 3 | 569 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 13.4 | 28.6 | | 1.3 | 16.5 | | 9.3 | 31.4 | 31.4 | 0.6 | 22.7 | |
| Effective Green, g (s) | 13.4 | 28.6 | | 1.3 | 16.5 | | 9.3 | 31.4 | 31.4 | 0.6 | 22.7 | |
| Actuated g/C Ratio | 0.17 | 0.36 | | 0.02 | 0.21 | | 0.12 | 0.40 | 0.40 | 0.01 | 0.29 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 282 | 547 | | 27 | 321 | | 195 | 1297 | 580 | 13 | 950 | |
| v/s Ratio Prot | c0.20 | c0.26 | | 0.01 | 0.01 | | c0.13 | 0.13 | | 0.00 | c0.17 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 1.20 | 0.72 | | 0.63 | 0.02 | | 1.11 | 0.34 | 0.00 | 0.23 | 0.60 | |
| Uniform Delay, d1 | 32.5 | 21.5 | | 38.3 | 24.6 | | 34.6 | 16.3 | 14.1 | 38.7 | 23.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 118.4 | 5.7 | | 50.7 | 0.1 | | 96.3 | 0.3 | 0.0 | 18.2 | 1.5 | |
| Delay (s) | 150.9 | 27.1 | | 89.1 | 24.6 | | 130.8 | 16.6 | 14.1 | 56.8 | 25.5 | |
| Level of Service | F | C | | F | C | | F | B | B | E | C | |
| Approach Delay (s) | | 72.0 | | | 55.9 | | | 54.3 | | | 25.6 | |
| Approach LOS | | E | | | E | | | D | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 54.2 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.87 | | |
| Actuated Cycle Length (s) | 78.4 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 70.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↗ | ↖ | ↕↕↕ | | ↖ | ↕↕ | |
| Volume (vph) | 3 | 0 | 0 | 18 | 0 | 73 | 0 | 1218 | 37 | 97 | 1082 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | | 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 | 1.00 | |
| Flt Protected | | 0.95 | | | 0.95 | 1.00 | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1770 | | | 1562 | 1397 | | 4929 | | 1618 | 3470 | |
| Flt Permitted | | 0.74 | | | 0.76 | 1.00 | | 1.00 | | 0.18 | 1.00 | |
| Satd. Flow (perm) | | 1386 | | | 1243 | 1397 | | 4929 | | 312 | 3470 | |
| 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) | 3 | 0 | 0 | 20 | 0 | 79 | 0 | 1324 | 40 | 105 | 1176 | 2 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 73 | 0 | 2 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 3 | 0 | 0 | 20 | 6 | 0 | 1362 | 0 | 105 | 1178 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 8.9 | | | 8.9 | 8.9 | | 92.5 | | 92.5 | 92.5 | |
| Effective Green, g (s) | | 8.9 | | | 8.9 | 8.9 | | 92.5 | | 92.5 | 92.5 | |
| Actuated g/C Ratio | | 0.08 | | | 0.08 | 0.08 | | 0.84 | | 0.84 | 0.84 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 112 | | | 100 | 113 | | 4144 | | 262 | 2917 | |
| v/s Ratio Prot | | | | | | | | 0.28 | | | c0.34 | |
| v/s Ratio Perm | | 0.00 | | | c0.02 | 0.00 | | | | 0.34 | | |
| v/c Ratio | | 0.03 | | | 0.20 | 0.06 | | 0.33 | | 0.40 | 0.40 | |
| Uniform Delay, d1 | | 46.6 | | | 47.2 | 46.7 | | 1.9 | | 2.1 | 2.1 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 0.52 | | 1.06 | 1.06 | |
| Incremental Delay, d2 | | 0.1 | | | 1.0 | 0.2 | | 0.2 | | 2.6 | 0.2 | |
| Delay (s) | | 46.7 | | | 48.2 | 46.9 | | 1.2 | | 4.8 | 2.5 | |
| Level of Service | | D | | | D | D | | A | | A | A | |
| Approach Delay (s) | | 46.7 | | | 47.2 | | | 1.2 | | | 2.7 | |
| Approach LOS | | D | | | D | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.6 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 49.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

30: Merced Street & Republic Ave

2020 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|-------|------|------|-------|------|-------|------|---------------------------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕↕ | ↕ | ↕↕ | ↕ | ↕↕ | ↕↕ | ↕↕ | |
| Volume (vph) | 54 | 7 | 17 | 138 | 7 | 458 | 2 | 985 | 136 | 343 | 824 | 41 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1712 | | | 1778 | 2787 | 1736 | 3471 | 1583 | 3433 | 3442 | | |
| Flt Permitted | | 0.62 | | | 0.70 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1097 | | | 1297 | 2787 | 1736 | 3471 | 1583 | 3433 | 3442 | | |
| 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) | 59 | 8 | 18 | 150 | 8 | 498 | 2 | 1071 | 148 | 373 | 896 | 45 | |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 0 | 407 | 0 | 0 | 43 | 0 | 2 | 0 | |
| Lane Group Flow (vph) | 0 | 75 | 0 | 0 | 158 | 91 | 2 | 1071 | 105 | 373 | 939 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | |
| Actuated Green, G (s) | | 20.2 | | | 20.2 | 20.2 | 1.2 | 59.1 | 59.1 | 17.2 | 75.1 | | |
| Effective Green, g (s) | | 20.2 | | | 20.2 | 20.2 | 1.2 | 59.1 | 59.1 | 17.2 | 75.1 | | |
| Actuated g/C Ratio | | 0.18 | | | 0.18 | 0.18 | 0.01 | 0.54 | 0.54 | 0.16 | 0.68 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | | 201 | | | 238 | 511 | 18 | 1864 | 850 | 536 | 2349 | | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.31 | | c0.11 | 0.27 | | |
| v/s Ratio Perm | | 0.07 | | | c0.12 | 0.03 | | | 0.07 | | | | |
| v/c Ratio | | 0.37 | | | 0.66 | 0.18 | 0.11 | 0.57 | 0.12 | 0.70 | 0.40 | | |
| Uniform Delay, d1 | | 39.4 | | | 41.7 | 37.9 | 53.9 | 17.0 | 12.6 | 43.9 | 7.6 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.78 | 0.55 | 0.35 | 0.78 | 1.81 | | |
| Incremental Delay, d2 | | 1.2 | | | 6.8 | 0.2 | 2.5 | 1.2 | 0.3 | 3.7 | 0.5 | | |
| Delay (s) | | 40.5 | | | 48.5 | 38.1 | 44.5 | 10.6 | 4.7 | 37.8 | 14.3 | | |
| Level of Service | | D | | | D | D | D | B | A | D | B | | |
| Approach Delay (s) | | 40.5 | | | 40.6 | | | 10.0 | | | 21.0 | | |
| Approach LOS | | D | | | D | | | A | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.3 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.61 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 59.5% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

2020 PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 47 | 41 | 13 | 686 | 793 | 30 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3221 | |
| Flt Permitted | 0.95 | 1.00 | 0.32 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 553 | 3240 | 3221 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 51 | 45 | 14 | 746 | 862 | 33 |
| RTOR Reduction (vph) | 0 | 41 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 51 | 4 | 14 | 746 | 891 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 5.0 | 5.0 | 41.0 | 41.0 | 41.0 | |
| Effective Green, g (s) | 5.0 | 5.0 | 41.0 | 41.0 | 41.0 | |
| Actuated g/C Ratio | 0.09 | 0.09 | 0.75 | 0.75 | 0.75 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 150 | 120 | 412 | 2415 | 2401 | |
| v/s Ratio Prot | c0.03 | | | 0.23 | c0.28 | |
| v/s Ratio Perm | | 0.00 | 0.03 | | | |
| v/c Ratio | 0.34 | 0.03 | 0.03 | 0.31 | 0.37 | |
| Uniform Delay, d1 | 23.5 | 22.8 | 1.8 | 2.3 | 2.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.43 | |
| Incremental Delay, d2 | 1.4 | 0.1 | 0.2 | 0.3 | 0.3 | |
| Delay (s) | 24.8 | 22.9 | 2.0 | 2.6 | 1.4 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.6 | 1.4 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.2 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.37 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 33.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2020 Saturday

HCM Signalized Intersection Capacity Analysis

2020 SAT

1: Doolittle Dr & Davis St



















| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|------|-------|------|------|-------|-------|-------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↖ | ↖ | ↗ | ↖ | ↗ | ↗ | ↖ |
| Volume (vph) | 12 | 74 | 12 | 145 | 74 | 345 | 19 | 204 | 279 | 456 | 274 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3120 | | 3255 | 1689 | 1489 | 1620 | 4655 | 1435 | 3143 | 3192 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3120 | | 3255 | 1689 | 1489 | 1620 | 4655 | 1435 | 3143 | 3192 | |
| 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) | 13 | 80 | 13 | 158 | 80 | 375 | 21 | 222 | 303 | 496 | 298 | 27 |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 0 | 188 | 0 | 0 | 182 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 13 | 82 | 0 | 158 | 80 | 187 | 21 | 222 | 121 | 496 | 320 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 0.8 | 11.1 | | 9.0 | 19.3 | 34.2 | 3.6 | 18.3 | 27.3 | 14.9 | 29.6 | |
| Effective Green, g (s) | 0.8 | 11.1 | | 9.0 | 19.3 | 34.2 | 3.6 | 18.3 | 27.3 | 14.9 | 29.6 | |
| Actuated g/C Ratio | 0.01 | 0.16 | | 0.13 | 0.28 | 0.50 | 0.05 | 0.27 | 0.40 | 0.22 | 0.43 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 19 | 504 | | 427 | 475 | 742 | 85 | 1241 | 571 | 682 | 1377 | |
| v/s Ratio Prot | 0.01 | 0.03 | | c0.05 | 0.05 | c0.05 | 0.01 | 0.05 | c0.03 | c0.16 | c0.10 | |
| v/s Ratio Perm | | | | | | 0.07 | | | 0.06 | | | |
| v/c Ratio | 0.68 | 0.16 | | 0.37 | 0.17 | 0.25 | 0.25 | 0.18 | 0.21 | 0.73 | 0.23 | |
| Uniform Delay, d1 | 33.8 | 24.8 | | 27.2 | 18.6 | 9.9 | 31.2 | 19.4 | 13.6 | 25.0 | 12.3 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 58.7 | 0.2 | | 0.2 | 0.2 | 0.1 | 0.6 | 0.1 | 0.1 | 3.3 | 0.2 | |
| Delay (s) | 92.5 | 24.9 | | 27.4 | 18.8 | 9.9 | 31.8 | 19.5 | 13.6 | 28.3 | 12.5 | |
| Level of Service | F | C | | C | B | A | C | B | B | C | B | |
| Approach Delay (s) | | 33.2 | | | 15.6 | | | 16.7 | | | 22.0 | |
| Approach LOS | | C | | | B | | | B | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.41 | | |
| Actuated Cycle Length (s) | 68.6 | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | 45.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2020 SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 20 | 206 | 10 | 22 | 274 | 18 | 4 | 16 | 35 | 14 | 17 | 15 |
| 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 |
| Hourly flow rate (vph) | 22 | 224 | 11 | 24 | 298 | 20 | 4 | 17 | 38 | 15 | 18 | 16 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 257 | 341 | 60 | 50 | | | | | | | | |
| Volume Left (vph) | 22 | 24 | 4 | 15 | | | | | | | | |
| Volume Right (vph) | 11 | 20 | 38 | 16 | | | | | | | | |
| Hadj (s) | 0.03 | 0.01 | -0.33 | -0.10 | | | | | | | | |
| Departure Headway (s) | 4.6 | 4.5 | 5.0 | 5.3 | | | | | | | | |
| Degree Utilization, x | 0.33 | 0.43 | 0.08 | 0.07 | | | | | | | | |
| Capacity (veh/h) | 755 | 772 | 633 | 601 | | | | | | | | |
| Control Delay (s) | 9.8 | 10.8 | 8.5 | 8.7 | | | | | | | | |
| Approach Delay (s) | 9.8 | 10.8 | 8.5 | 8.7 | | | | | | | | |
| Approach LOS | A | B | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.1 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 34.3% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2020 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 82 | 241 | 29 | 201 | 330 | 159 | 17 | 254 | 179 | 153 | 265 | 67 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1450 | 1620 | 1739 | 1401 | 1652 | 3240 | 1332 | 1620 | 2979 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1450 | 1620 | 1739 | 1401 | 1652 | 3240 | 1332 | 1620 | 2979 | |
| 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) | 89 | 262 | 32 | 218 | 359 | 173 | 18 | 276 | 195 | 166 | 288 | 73 |
| RTOR Reduction (vph) | 0 | 0 | 25 | 0 | 0 | 115 | 0 | 0 | 155 | 0 | 16 | 0 |
| Lane Group Flow (vph) | 89 | 262 | 7 | 218 | 359 | 58 | 18 | 276 | 40 | 166 | 345 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 9.7 | 21.4 | 21.4 | 18.9 | 30.6 | 30.6 | 3.0 | 19.1 | 19.1 | 16.4 | 32.5 | |
| Effective Green, g (s) | 9.7 | 21.4 | 21.4 | 18.9 | 30.6 | 30.6 | 3.0 | 19.1 | 19.1 | 16.4 | 32.5 | |
| Actuated g/C Ratio | 0.10 | 0.23 | 0.23 | 0.20 | 0.33 | 0.33 | 0.03 | 0.20 | 0.20 | 0.17 | 0.35 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 170 | 396 | 330 | 326 | 567 | 457 | 52 | 659 | 271 | 283 | 1032 | |
| v/s Ratio Prot | 0.05 | 0.15 | | c0.13 | c0.21 | | 0.01 | c0.09 | | c0.10 | 0.12 | |
| v/s Ratio Perm | | | 0.01 | | | 0.04 | | | 0.03 | | | |
| v/c Ratio | 0.52 | 0.66 | 0.02 | 0.67 | 0.63 | 0.13 | 0.35 | 0.42 | 0.15 | 0.59 | 0.33 | |
| Uniform Delay, d1 | 39.9 | 32.9 | 28.1 | 34.6 | 26.8 | 22.2 | 44.4 | 32.5 | 30.7 | 35.6 | 22.7 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.8 | 4.5 | 0.0 | 5.6 | 2.6 | 0.2 | 5.4 | 0.6 | 0.3 | 3.6 | 0.3 | |
| Delay (s) | 43.6 | 37.4 | 28.1 | 40.2 | 29.4 | 22.4 | 49.8 | 33.1 | 31.0 | 39.2 | 22.9 | |
| Level of Service | D | D | C | D | C | C | D | C | C | D | C | |
| Approach Delay (s) | | 38.1 | | | 30.9 | | | 32.9 | | | 28.1 | |
| Approach LOS | | D | | | C | | | C | | | C | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 31.9 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.60 | C |
| Actuated Cycle Length (s) | 93.8 | Sum of lost time (s) |
| Intersection Capacity Utilization | 55.4% | 18.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | B |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

2020 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|-------|-------|------|------|
| Lane Configurations | ↘ | ↗↗↗ | | ↘↘ | ↗↗ | | ↘ | ↗↗ | ↗↗ | ↘↘ | ↗↗ | ↘ |
| Volume (vph) | 43 | 580 | 71 | 772 | 616 | 108 | 82 | 233 | 634 | 167 | 199 | 24 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4579 | | 3255 | 3159 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1471 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4579 | | 3255 | 3159 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1471 |
| 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) | 47 | 630 | 77 | 839 | 670 | 117 | 89 | 253 | 689 | 182 | 216 | 26 |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| Lane Group Flow (vph) | 47 | 695 | 0 | 839 | 777 | 0 | 89 | 253 | 689 | 182 | 216 | 5 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 9.1 | 26.1 | | 49.1 | 66.1 | | 15.0 | 25.0 | 74.1 | 13.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 9.1 | 27.6 | | 49.1 | 67.6 | | 15.0 | 26.5 | 74.1 | 13.0 | 24.5 | 24.5 |
| Actuated g/C Ratio | 0.07 | 0.21 | | 0.37 | 0.51 | | 0.11 | 0.20 | 0.56 | 0.10 | 0.19 | 0.19 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 107 | 955 | | 1208 | 1615 | | 190 | 672 | 1516 | 320 | 600 | 272 |
| v/s Ratio Prot | 0.03 | c0.15 | | c0.26 | 0.25 | | 0.05 | 0.08 | c0.25 | c0.06 | 0.07 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 |
| v/c Ratio | 0.44 | 0.73 | | 0.69 | 0.48 | | 0.47 | 0.38 | 0.45 | 0.57 | 0.36 | 0.02 |
| Uniform Delay, d1 | 59.1 | 48.8 | | 35.2 | 20.9 | | 54.9 | 45.7 | 17.1 | 56.9 | 47.0 | 44.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 3.9 | 3.0 | | 3.3 | 0.3 | | 8.1 | 0.5 | 0.3 | 7.2 | 0.5 | 0.0 |
| Delay (s) | 63.0 | 51.8 | | 38.5 | 21.2 | | 62.9 | 46.2 | 17.4 | 64.1 | 47.5 | 44.1 |
| Level of Service | E | D | | D | C | | E | D | B | E | D | D |
| Approach Delay (s) | | 52.5 | | | 30.1 | | | 28.4 | | | 54.4 | |
| Approach LOS | | D | | | C | | | C | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 36.8 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.64 | D |
| Actuated Cycle Length (s) | 132.2 | Sum of lost time (s) |
| Intersection Capacity Utilization | 73.7% | ICU Level of Service |
| Analysis Period (min) | 15 | D |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2020 SAT



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|-------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↙ | ↑↑ | | ↗ |
| Volume (vph) | 1344 | 91 | 504 | 0 | 0 | 430 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 0.99 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6347 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6347 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1461 | 99 | 548 | 0 | 0 | 467 |
| RTOR Reduction (vph) | 18 | 0 | 0 | 0 | 0 | 5 |
| Lane Group Flow (vph) | 1542 | 0 | 548 | 0 | 0 | 462 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 21.1 | | 19.7 | | | 19.7 |
| Effective Green, g (s) | 21.1 | | 19.7 | | | 19.7 |
| Actuated g/C Ratio | 0.42 | | 0.39 | | | 0.39 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 2662 | | 693 | | | 630 |
| v/s Ratio Prot | c0.24 | | c0.31 | | | 0.29 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.58 | | 0.79 | | | 0.73 |
| Uniform Delay, d1 | 11.2 | | 13.5 | | | 13.1 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.3 | | 6.1 | | | 4.4 |
| Delay (s) | 11.5 | | 19.6 | | | 17.5 |
| Level of Service | B | | B | | | B |
| Approach Delay (s) | 11.5 | | | 19.6 | 17.5 | |
| Approach LOS | B | | | B | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 50.3 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 56.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|------|------|-------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1156 | 526 | 476 | 875 | 0 | 0 | 0 | 480 | 0 | 0 | 1042 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1257 | 572 | 517 | 951 | 0 | 0 | 0 | 522 | 0 | 0 | 1133 | |
| RTOR Reduction (vph) | 0 | 0 | 317 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 193 | |
| Lane Group Flow (vph) | 0 | 1257 | 255 | 517 | 951 | 0 | 0 | 0 | 522 | 0 | 0 | 940 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 45.4 | 45.4 | 16.5 | 68.9 | | | | 32.5 | | | 32.5 | |
| Effective Green, g (s) | | 45.4 | 45.4 | 16.5 | 68.9 | | | | 32.5 | | | 32.5 | |
| Actuated g/C Ratio | | 0.42 | 0.42 | 0.15 | 0.64 | | | | 0.30 | | | 0.30 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1411 | 1111 | 480 | 2142 | | | | 878 | | | 839 | |
| v/s Ratio Prot | | c0.37 | | c0.16 | 0.28 | | | | 0.18 | | | c0.34 | |
| v/s Ratio Perm | | | 0.10 | | | | | | | | | | |
| v/c Ratio | | 0.89 | 0.23 | 1.08 | 0.44 | | | | 0.59 | | | 1.12 | |
| Uniform Delay, d1 | | 29.0 | 20.0 | 45.7 | 9.8 | | | | 32.1 | | | 37.7 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 7.4 | 0.1 | 63.4 | 0.1 | | | | 1.1 | | | 69.8 | |
| Delay (s) | | 36.4 | 20.1 | 109.1 | 10.0 | | | | 33.2 | | | 107.5 | |
| Level of Service | | D | C | F | A | | | | C | | | F | |
| Approach Delay (s) | | 31.3 | | | 44.9 | | | 33.2 | | | 107.5 | | |
| Approach LOS | | C | | | D | | | C | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 53.0 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 1.00 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 107.9 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 67.7% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps


















2020 SAT



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|-------|------|-------|-------|---------------------------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 447 | 0 | 823 | 519 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 486 | 0 | 895 | 564 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 111 | 0 | 0 |
| Lane Group Flow (vph) | 486 | 0 | 895 | 453 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 17.8 | | 20.6 | 20.6 | | |
| Effective Green, g (s) | 17.8 | | 20.6 | 20.6 | | |
| Actuated g/C Ratio | 0.38 | | 0.43 | 0.43 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 608 | | 1458 | 665 | | |
| v/s Ratio Prot | c0.30 | | 0.27 | | | |
| v/s Ratio Perm | | | | c0.30 | | |
| v/c Ratio | 0.80 | | 0.61 | 0.68 | | |
| Uniform Delay, d1 | 13.2 | | 10.3 | 10.8 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 7.3 | | 0.8 | 2.9 | | |
| Delay (s) | 20.5 | | 11.1 | 13.6 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 20.5 | 12.1 | | 0.0 | |
| Approach LOS | | C | B | | A | |
| Intersection Summary | | | | | | |
| HCM 2000 Control Delay | | | 14.2 | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.74 | | | |
| Actuated Cycle Length (s) | | | 47.4 | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 64.4% | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | |
| c Critical Lane Group | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2020 SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 4 | 133 | 10 | 25 | 117 | 17 | 15 | 18 | 32 | 14 | 9 | 15 |
| 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 |
| Hourly flow rate (vph) | 4 | 145 | 11 | 27 | 127 | 18 | 16 | 20 | 35 | 15 | 10 | 16 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 4 | 155 | 173 | 71 | 41 | | | | | | | |
| Volume Left (vph) | 4 | 0 | 27 | 16 | 15 | | | | | | | |
| Volume Right (vph) | 0 | 11 | 18 | 35 | 16 | | | | | | | |
| Hadj (s) | 0.53 | -0.01 | 0.00 | -0.22 | -0.13 | | | | | | | |
| Departure Headway (s) | 5.4 | 4.9 | 4.5 | 4.5 | 4.6 | | | | | | | |
| Degree Utilization, x | 0.01 | 0.21 | 0.21 | 0.09 | 0.05 | | | | | | | |
| Capacity (veh/h) | 644 | 711 | 775 | 737 | 709 | | | | | | | |
| Control Delay (s) | 7.3 | 8.0 | 8.7 | 8.0 | 7.9 | | | | | | | |
| Approach Delay (s) | 8.0 | | 8.7 | 8.0 | 7.9 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.2 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 30.5% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 23: Doolittle Dr & Fairway Drive/Fairway Dr

2020 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 66 | 105 | 53 | 72 | 101 | 136 | 47 | 258 | 70 | 98 | 261 | 62 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.97 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1701 | 1259 | 1620 | 1739 | 1318 | 1711 | 2965 | | 1620 | 2986 | |
| Flt Permitted | | 0.83 | 1.00 | 0.64 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1440 | 1259 | 1092 | 1739 | 1318 | 1711 | 2965 | | 1620 | 2986 | |
| 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) | 72 | 114 | 58 | 78 | 110 | 148 | 51 | 280 | 76 | 107 | 284 | 67 |
| RTOR Reduction (vph) | 0 | 0 | 44 | 0 | 0 | 111 | 0 | 33 | 0 | 0 | 24 | 0 |
| Lane Group Flow (vph) | 0 | 186 | 14 | 78 | 110 | 37 | 51 | 323 | 0 | 107 | 327 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 13.1 | 13.1 | 13.1 | 13.1 | 13.1 | 2.9 | 17.2 | | 7.4 | 21.7 | |
| Effective Green, g (s) | | 13.1 | 13.1 | 13.1 | 13.1 | 13.1 | 2.9 | 17.2 | | 7.4 | 21.7 | |
| Actuated g/C Ratio | | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.06 | 0.33 | | 0.14 | 0.41 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 357 | 312 | 271 | 432 | 327 | 94 | 967 | | 227 | 1229 | |
| v/s Ratio Prot | | | | | 0.06 | | 0.03 | c0.11 | | c0.07 | c0.11 | |
| v/s Ratio Perm | | c0.13 | 0.01 | 0.07 | | 0.03 | | | | | | |
| v/c Ratio | | 0.52 | 0.05 | 0.29 | 0.25 | 0.11 | 0.54 | 0.33 | | 0.47 | 0.27 | |
| Uniform Delay, d1 | | 17.1 | 15.1 | 16.0 | 15.9 | 15.3 | 24.3 | 13.4 | | 20.8 | 10.2 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.4 | 0.1 | 0.6 | 0.3 | 0.2 | 6.3 | 0.3 | | 1.5 | 0.2 | |
| Delay (s) | | 18.5 | 15.1 | 16.6 | 16.2 | 15.5 | 30.5 | 13.7 | | 22.4 | 10.4 | |
| Level of Service | | B | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 17.7 | | | 16.0 | | | 15.8 | | | 13.2 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 15.3 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.41 | B |
| Actuated Cycle Length (s) | 52.7 | Sum of lost time (s) |
| Intersection Capacity Utilization | 45.9% | 15.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

2020 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 122 | 164 | 70 | 72 | 217 | 71 | 58 | 443 | 73 | 68 | 458 | 97 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3160 | | 1593 | 3140 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3160 | | 1593 | 3140 | |
| 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) | 133 | 178 | 76 | 78 | 236 | 77 | 63 | 482 | 79 | 74 | 498 | 105 |
| RTOR Reduction (vph) | 0 | 0 | 58 | 0 | 0 | 60 | 0 | 9 | 0 | 0 | 12 | 0 |
| Lane Group Flow (vph) | 133 | 178 | 18 | 78 | 236 | 17 | 63 | 552 | 0 | 74 | 591 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 15.6 | 26.5 | 26.5 | 14.3 | 25.2 | 25.2 | 8.6 | 43.1 | | 9.7 | 44.2 | |
| Effective Green, g (s) | 15.6 | 26.5 | 26.5 | 14.3 | 25.2 | 25.2 | 8.6 | 43.1 | | 9.7 | 44.2 | |
| Actuated g/C Ratio | 0.14 | 0.24 | 0.24 | 0.13 | 0.22 | 0.22 | 0.08 | 0.38 | | 0.09 | 0.39 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 218 | 434 | 307 | 202 | 416 | 302 | 126 | 1209 | | 137 | 1232 | |
| v/s Ratio Prot | c0.08 | 0.10 | | 0.05 | c0.13 | | 0.04 | c0.17 | | 0.05 | c0.19 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.61 | 0.41 | 0.06 | 0.39 | 0.57 | 0.06 | 0.50 | 0.46 | | 0.54 | 0.48 | |
| Uniform Delay, d1 | 45.6 | 36.4 | 33.4 | 45.1 | 38.9 | 34.4 | 49.9 | 26.0 | | 49.3 | 25.6 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.7 | 0.9 | 0.1 | 1.7 | 2.2 | 0.1 | 4.2 | 1.2 | | 5.4 | 0.8 | |
| Delay (s) | 51.3 | 37.3 | 33.5 | 46.8 | 41.0 | 34.5 | 54.1 | 27.2 | | 54.7 | 26.4 | |
| Level of Service | D | D | C | D | D | C | D | C | | D | C | |
| Approach Delay (s) | | 41.4 | | | 40.9 | | | 30.0 | | | 29.5 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary



























| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 34.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.53 | | |
| Actuated Cycle Length (s) | 112.6 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 63.9% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2020 + Project AM

HCM Signalized Intersection Capacity Analysis
1: Doolittle Dr & Davis St

2020 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|--|---|--|---|--|---|---|---|--|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |   | |   |  |  |  |    |  |   | | |
| Volume (vph) | 26 | 94 | 36 | 249 | 102 | 857 | 56 | 772 | 486 | 425 | 436 | 44 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3063 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1434 | 3143 | 3187 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3063 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1434 | 3143 | 3187 | |
| 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) | 28 | 102 | 39 | 271 | 111 | 932 | 61 | 839 | 528 | 462 | 474 | 48 |
| RTOR Reduction (vph) | 0 | 33 | 0 | 0 | 0 | 168 | 0 | 0 | 234 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 28 | 108 | 0 | 271 | 111 | 764 | 61 | 839 | 294 | 462 | 516 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 2.7 | 14.0 | | 11.9 | 23.2 | 49.2 | 16.0 | 24.6 | 36.5 | 26.0 | 34.6 | |
| Effective Green, g (s) | 2.7 | 14.0 | | 11.9 | 23.2 | 49.2 | 16.0 | 24.6 | 36.5 | 26.0 | 34.6 | |
| Actuated g/C Ratio | 0.03 | 0.15 | | 0.13 | 0.25 | 0.54 | 0.17 | 0.27 | 0.40 | 0.28 | 0.38 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 49 | 467 | | 421 | 426 | 799 | 282 | 1247 | 570 | 890 | 1201 | |
| v/s Ratio Prot | 0.02 | 0.04 | | c0.08 | 0.07 | c0.27 | 0.04 | c0.18 | 0.07 | 0.15 | 0.16 | |
| v/s Ratio Perm | | | | | | 0.24 | | | 0.14 | | | |
| v/c Ratio | 0.57 | 0.23 | | 0.64 | 0.26 | 0.96 | 0.22 | 0.67 | 0.52 | 0.52 | 0.43 | |
| Uniform Delay, d1 | 44.0 | 34.2 | | 37.9 | 27.4 | 20.3 | 32.5 | 30.0 | 21.0 | 27.6 | 21.3 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 9.6 | 0.3 | | 2.5 | 0.3 | 21.3 | 0.1 | 1.6 | 0.3 | 0.2 | 0.4 | |
| Delay (s) | 53.6 | 34.4 | | 40.5 | 27.8 | 41.6 | 32.7 | 31.6 | 21.3 | 27.9 | 21.7 | |
| Level of Service | D | C | | D | C | D | C | C | C | C | C | |
| Approach Delay (s) | | 37.6 | | | 40.2 | | | 27.8 | | | 24.6 | |
| Approach LOS | | D | | | D | | | C | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 31.6 | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.86 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 91.8 | | | | | | | 15.3 | | |
| Intersection Capacity Utilization | | | 83.0% | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

2: Phillips Ln & Davis St

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|-------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 76 | 910 | 10 | 23 | 1248 | 142 | 24 | 1 | 86 | 90 | 1 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3173 | | 1620 | 3069 | 1323 | 1678 | 1432 | | 3143 | 1395 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.33 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3173 | | 1620 | 3069 | 1323 | 574 | 1432 | | 3143 | 1395 | |
| 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) | 83 | 989 | 11 | 25 | 1357 | 154 | 26 | 1 | 93 | 98 | 1 | 58 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 82 | 0 | 0 | 50 | 0 |
| Lane Group Flow (vph) | 83 | 1000 | 0 | 25 | 1372 | 93 | 26 | 12 | 0 | 98 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 9.5 | 61.6 | | 4.3 | 56.4 | 70.2 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Effective Green, g (s) | 9.5 | 61.6 | | 4.3 | 56.4 | 70.2 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.09 | 0.59 | | 0.04 | 0.54 | 0.67 | 0.12 | 0.12 | | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 146 | 1861 | | 66 | 1648 | 884 | 67 | 167 | | 413 | 183 | |
| v/s Ratio Prot | c0.05 | 0.32 | | 0.02 | c0.45 | 0.01 | | 0.01 | | c0.03 | | |
| v/s Ratio Perm | | | | | | 0.06 | c0.05 | | | | | 0.01 |
| v/c Ratio | 0.57 | 0.54 | | 0.38 | 0.83 | 0.11 | 0.39 | 0.07 | | 0.24 | 0.05 | |
| Uniform Delay, d1 | 45.8 | 13.1 | | 49.0 | 20.3 | 6.2 | 42.9 | 41.3 | | 40.9 | 39.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.18 | 0.65 | 2.12 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.0 | 1.1 | | 1.2 | 4.5 | 0.0 | 1.4 | 0.1 | | 0.3 | 0.1 | |
| Delay (s) | 48.8 | 14.2 | | 59.1 | 17.6 | 13.2 | 44.2 | 41.3 | | 41.2 | 40.0 | |
| Level of Service | D | B | | E | B | B | D | D | | D | D | |
| Approach Delay (s) | | 16.9 | | | 17.9 | | | 42.0 | | | 40.7 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.7 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.66 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 69.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↵ | ↑↑↑ | | ↵↵ | ↑↑↑ | | | ↑ | ↵↵ | ↵ | ↑ | |
| Volume (vph) | 8 | 1012 | 63 | 222 | 1320 | 41 | 84 | 30 | 172 | 117 | 56 | 26 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.91 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4528 | | 3143 | 4751 | | | 1821 | 2806 | 1562 | 1546 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.73 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4528 | | 3143 | 4751 | | | 1372 | 2806 | 1562 | 1546 | |
| 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) | 9 | 1100 | 68 | 241 | 1435 | 45 | 91 | 33 | 187 | 127 | 61 | 28 |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 3 | 0 | 0 | 0 | 137 | 0 | 16 | 0 |
| Lane Group Flow (vph) | 9 | 1162 | 0 | 241 | 1477 | 0 | 0 | 124 | 50 | 127 | 73 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 1.2 | 49.9 | | 13.9 | 63.1 | | | 13.9 | 27.8 | 13.8 | 13.8 | |
| Effective Green, g (s) | 1.2 | 49.9 | | 13.9 | 63.1 | | | 13.9 | 27.8 | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.01 | 0.48 | | 0.13 | 0.60 | | | 0.13 | 0.26 | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 18 | 2151 | | 416 | 2855 | | | 181 | 742 | 205 | 203 | |
| v/s Ratio Prot | 0.01 | c0.26 | | c0.08 | 0.31 | | | | 0.01 | c0.08 | 0.05 | |
| v/s Ratio Perm | | | | | | | | c0.09 | 0.01 | | | |
| v/c Ratio | 0.50 | 0.54 | | 0.58 | 0.52 | | | 0.69 | 0.07 | 0.62 | 0.36 | |
| Uniform Delay, d1 | 51.6 | 19.5 | | 42.8 | 12.1 | | | 43.5 | 28.9 | 43.1 | 41.6 | |
| Progression Factor | 0.69 | 0.53 | | 1.18 | 0.82 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.9 | 0.9 | | 0.8 | 0.4 | | | 8.3 | 0.0 | 3.9 | 0.4 | |
| Delay (s) | 42.4 | 11.1 | | 51.5 | 10.4 | | | 51.7 | 28.9 | 47.0 | 42.0 | |
| Level of Service | D | B | | D | B | | | D | C | D | D | |
| Approach Delay (s) | | 11.3 | | | 16.2 | | | 38.0 | | | 44.9 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.58 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 68.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: I-880 SB ramps & Davis St/Davis Street

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|--------|------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 795 | 487 | 0 | 1228 | 409 | 0 | 0 | 0 | 215 | 0 | 407 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.96 | | | | | 1.00 | 0.86 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3111 | | | | | 1681 | 1421 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3111 | | | | | 1681 | 1421 | 1461 |
| 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 | 864 | 529 | 0 | 1335 | 445 | 0 | 0 | 0 | 234 | 0 | 442 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 34 | 34 |
| Lane Group Flow (vph) | 0 | 864 | 529 | 0 | 1757 | 0 | 0 | 0 | 0 | 211 | 201 | 196 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 71.2 | 105.0 | | 71.2 | | | | | 25.8 | 25.8 | 25.8 |
| Effective Green, g (s) | | 71.2 | 105.0 | | 71.2 | | | | | 25.8 | 25.8 | 25.8 |
| Actuated g/C Ratio | | 0.68 | 1.00 | | 0.68 | | | | | 0.25 | 0.25 | 0.25 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2232 | 1439 | | 2109 | | | | | 413 | 349 | 358 |
| v/s Ratio Prot | | 0.26 | | | c0.56 | | | | | 0.13 | c0.14 | 0.13 |
| v/s Ratio Perm | | | 0.37 | | | | | | | | | |
| v/c Ratio | | 0.39 | 0.37 | | 0.83 | | | | | 0.51 | 0.58 | 0.55 |
| Uniform Delay, d1 | | 7.4 | 0.0 | | 12.5 | | | | | 34.2 | 34.8 | 34.5 |
| Progression Factor | | 0.45 | 1.00 | | 0.91 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.4 | 0.1 | | 3.7 | | | | | 1.1 | 2.3 | 1.7 |
| Delay (s) | | 3.8 | 0.1 | | 15.0 | | | | | 35.2 | 37.1 | 36.2 |
| Level of Service | | A | A | | B | | | | | D | D | D |
| Approach Delay (s) | | 2.4 | | | 15.0 | | | 0.0 | | | 36.2 | |
| Approach LOS | | A | | | B | | | A | | | D | |

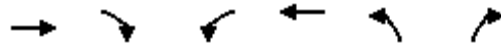
Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.76 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 70.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

2020 AM + Project



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↘↘ | ↗ |
| Volume (vph) | 543 | 637 | 0 | 1093 | 519 | 185 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Flt | 0.92 | | | 1.00 | 0.99 | 0.85 |
| Flt Protected | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3253 | | | 3539 | 3430 | 1441 |
| Flt Permitted | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3253 | | | 3539 | 3430 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 590 | 692 | 0 | 1188 | 564 | 201 |
| RTOR Reduction (vph) | 135 | 0 | 0 | 0 | 3 | 142 |
| Lane Group Flow (vph) | 1147 | 0 | 0 | 1188 | 581 | 39 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 75.4 | | | 75.4 | 22.6 | 22.6 |
| Effective Green, g (s) | 75.4 | | | 75.4 | 22.6 | 22.6 |
| Actuated g/C Ratio | 0.72 | | | 0.72 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2335 | | | 2541 | 738 | 310 |
| v/s Ratio Prot | c0.35 | | | 0.34 | c0.17 | 0.03 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.49 | | | 0.47 | 0.79 | 0.13 |
| Uniform Delay, d1 | 6.4 | | | 6.3 | 38.9 | 33.2 |
| Progression Factor | 0.73 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.7 | | | 0.6 | 5.1 | 0.1 |
| Delay (s) | 5.4 | | | 6.9 | 44.1 | 33.3 |
| Level of Service | A | | | A | D | C |
| Approach Delay (s) | 5.4 | | | 6.9 | 41.5 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.56 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 58.9% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

6: Doolittle Dr & Williams St

2020 AM + Project

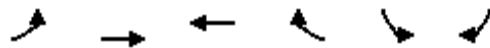


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|------|---------------------------|------|------|-------|------|-------|------|------|--|
| Lane Configurations | | ↕↕ | | | ↕ | ↕ | ↕ | ↕↕ | | ↕ | ↕↕ | | |
| Volume (vph) | 104 | 126 | 19 | 80 | 88 | 141 | 28 | 1148 | 84 | 46 | 488 | 59 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | | |
| Flt Protected | | 0.98 | | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1533 | | | 1691 | 1303 | 1620 | 3041 | | 1562 | 3018 | | |
| Flt Permitted | | 0.75 | | | 0.72 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1166 | | | 1253 | 1303 | 1620 | 3041 | | 1562 | 3018 | | |
| 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) | 113 | 137 | 21 | 87 | 96 | 153 | 30 | 1248 | 91 | 50 | 530 | 64 | |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 111 | 0 | 5 | 0 | 0 | 9 | 0 | |
| Lane Group Flow (vph) | 0 | 267 | 0 | 0 | 183 | 42 | 30 | 1334 | 0 | 50 | 585 | 0 | |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | 5 | | 2 | 2 | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 19.3 | | | 19.3 | 19.3 | 3.3 | 31.5 | | 5.5 | 33.2 | | |
| Effective Green, g (s) | | 19.3 | | | 19.3 | 19.3 | 3.3 | 31.5 | | 5.5 | 33.2 | | |
| Actuated g/C Ratio | | 0.28 | | | 0.28 | 0.28 | 0.05 | 0.45 | | 0.08 | 0.48 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 323 | | | 347 | 361 | 76 | 1378 | | 123 | 1441 | | |
| v/s Ratio Prot | | | | | | | 0.02 | c0.44 | | c0.03 | 0.19 | | |
| v/s Ratio Perm | | c0.23 | | | 0.15 | 0.03 | | | | | | | |
| v/c Ratio | | 0.83 | | | 0.53 | 0.12 | 0.39 | 0.97 | | 0.41 | 0.41 | | |
| Uniform Delay, d1 | | 23.5 | | | 21.2 | 18.7 | 32.1 | 18.5 | | 30.4 | 11.8 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 16.5 | | | 1.9 | 0.2 | 4.6 | 17.0 | | 3.0 | 0.3 | | |
| Delay (s) | | 40.1 | | | 23.1 | 18.9 | 36.7 | 35.5 | | 33.4 | 12.0 | | |
| Level of Service | | D | | | C | B | D | D | | C | B | | |
| Approach Delay (s) | | 40.1 | | | 21.2 | | | 35.6 | | | 13.7 | | |
| Approach LOS | | D | | | C | | | D | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 28.8 | | HCM 2000 Level of Service | | | | | | C | | |
| HCM 2000 Volume to Capacity ratio | | | 0.87 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 69.5 | | Sum of lost time (s) | | | | | | 13.7 | | |
| Intersection Capacity Utilization | | | 73.3% | | ICU Level of Service | | | | | | D | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

2020 AM + Project



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 31 | 249 | 365 | 227 | 134 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 34 | 271 | 397 | 247 | 146 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 64 | 0 | 49 |
| Lane Group Flow (vph) | 34 | 271 | 397 | 183 | 146 | 8 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 4.8 | 85.8 | 77.0 | 77.0 | 15.6 | 15.6 |
| Effective Green, g (s) | 4.8 | 85.8 | 77.0 | 77.0 | 15.6 | 15.6 |
| Actuated g/C Ratio | 0.04 | 0.78 | 0.70 | 0.70 | 0.14 | 0.14 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 70 | 1425 | 1193 | 1089 | 221 | 191 |
| v/s Ratio Prot | c0.02 | 0.15 | c0.23 | | c0.09 | |
| v/s Ratio Perm | | | | 0.12 | | 0.01 |
| v/c Ratio | 0.49 | 0.19 | 0.33 | 0.17 | 0.66 | 0.04 |
| Uniform Delay, d1 | 51.4 | 3.1 | 6.5 | 5.6 | 44.7 | 40.8 |
| Progression Factor | 1.00 | 1.00 | 1.18 | 1.80 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.9 | 0.3 | 0.6 | 0.3 | 7.2 | 0.1 |
| Delay (s) | 53.3 | 3.4 | 8.2 | 10.4 | 51.9 | 40.8 |
| Level of Service | D | A | A | B | D | D |
| Approach Delay (s) | | 9.0 | 9.1 | | 48.8 | |
| Approach LOS | | A | A | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 41.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis 2020 AM + Project
8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBT | EBR | WBL | WBT | WBR | NBL2 | NBL | NBR | SBT | SEL | SER |
|------------------------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | ↑ | ↗ | ↖ | ↘ | | | ↖ | ↗ | ↕ | ↘ | ↙ |
| Volume (vph) | 287 | 112 | 191 | 314 | 1 | 321 | 5 | 226 | 7 | 0 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 9 | 10 | 10 | 11 | 11 | 16 | 12 | 12 | 12 |
| Total Lost time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.97 | 1.00 | 1.00 | | | 1.00 | 0.97 | 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 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.86 | |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| 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 |
| Adj. Flow (vph) | 312 | 122 | 208 | 341 | 1 | 349 | 5 | 246 | 8 | 0 | 8 |
| RTOR Reduction (vph) | 0 | 81 | 0 | 0 | 0 | 0 | 0 | 104 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 312 | 41 | 208 | 342 | 0 | 0 | 354 | 142 | 8 | 8 | 0 |
| Confl. Peds. (#/hr) | | 14 | | | | | | 2 | | 2 | |
| Confl. Bikes (#/hr) | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Turn Type | NA | Perm | Prot | NA | | Prot | Prot | Perm | NA | Prot | |
| Protected Phases | 2 | | 1 | 6 | | 4 | 4 | | 8 | 7 | |
| Permitted Phases | | 2 | | | | | | 4 | | | |
| Actuated Green, G (s) | 37.4 | 37.4 | 18.7 | 60.1 | | | 29.5 | 29.5 | 1.4 | 2.4 | |
| Effective Green, g (s) | 37.4 | 37.4 | 18.7 | 60.1 | | | 29.5 | 29.5 | 1.4 | 2.4 | |
| Actuated g/C Ratio | 0.34 | 0.34 | 0.17 | 0.55 | | | 0.27 | 0.27 | 0.01 | 0.02 | |
| Clearance Time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 598 | 489 | 265 | 931 | | | 450 | 458 | 23 | 34 | |
| v/s Ratio Prot | c0.18 | | c0.13 | 0.20 | | | c0.21 | | c0.00 | c0.01 | |
| v/s Ratio Perm | | 0.03 | | | | | | 0.08 | | | |
| v/c Ratio | 0.52 | 0.08 | 0.78 | 0.37 | | | 0.79 | 0.31 | 0.35 | 0.24 | |
| Uniform Delay, d1 | 29.1 | 24.7 | 43.7 | 14.2 | | | 37.3 | 32.1 | 53.8 | 52.9 | |
| Progression Factor | 0.97 | 1.16 | 1.00 | 1.00 | | | 0.63 | 0.51 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.2 | 0.3 | 14.1 | 1.1 | | | 7.4 | 0.3 | 8.9 | 3.5 | |
| Delay (s) | 31.3 | 29.0 | 57.8 | 15.3 | | | 30.9 | 16.6 | 62.8 | 56.4 | |
| Level of Service | C | C | E | B | | | C | B | E | E | |
| Approach Delay (s) | 30.7 | | | 31.4 | | | | | 62.8 | 56.4 | |
| Approach LOS | C | | | C | | | | | E | E | |

Intersection Summary


















| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 29.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 20.6 |
| Intersection Capacity Utilization | 82.5% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

















9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

2020 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  |  | | |  |  | | |
| Volume (veh/h) | 0 | 278 | 5 | 0 | 618 | 14 | 0 | 0 | 15 | 35 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 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 |
| Hourly flow rate (vph) | 0 | 302 | 5 | 0 | 672 | 15 | 0 | 0 | 16 | 38 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 687 | | | 308 | | | 977 | 992 | 305 | 993 | 979 | 672 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 687 | | | 308 | | | 977 | 992 | 305 | 993 | 979 | 672 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 98 | 83 | 100 | 100 |
| cM capacity (veh/h) | 907 | | | 1253 | | | 230 | 246 | 735 | 219 | 250 | 456 |
| Direction, Lane # | EB 1 | WB 1 | WB 2 | NB 1 | SB 1 | | | | | | | |
| Volume Total | 308 | 672 | 15 | 16 | 38 | | | | | | | |
| Volume Left | 0 | 0 | 0 | 0 | 38 | | | | | | | |
| Volume Right | 5 | 0 | 15 | 16 | 0 | | | | | | | |
| cSH | 1700 | 1700 | 1700 | 735 | 219 | | | | | | | |
| Volume to Capacity | 0.18 | 0.40 | 0.01 | 0.02 | 0.17 | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | 2 | 15 | | | | | | | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 10.0 | 24.8 | | | | | | | |
| Lane LOS | | | | B | C | | | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 10.0 | 24.8 | | | | | | | |
| Approach LOS | | | | B | C | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | 1.1 | | | | | | | | |
| Intersection Capacity Utilization | | | 42.5% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2020 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 46 | 313 | 12 | 27 | 561 | 81 | 15 | 131 | 53 | 45 | 51 | 25 |
| 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 |
| Hourly flow rate (vph) | 50 | 340 | 13 | 29 | 610 | 88 | 16 | 142 | 58 | 49 | 55 | 27 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 403 | 727 | 216 | 132 | | | | | | | | |
| Volume Left (vph) | 50 | 29 | 16 | 49 | | | | | | | | |
| Volume Right (vph) | 13 | 88 | 58 | 27 | | | | | | | | |
| Hadj (s) | 0.04 | -0.03 | -0.11 | -0.02 | | | | | | | | |
| Departure Headway (s) | 6.4 | 6.0 | 7.1 | 7.5 | | | | | | | | |
| Degree Utilization, x | 0.71 | 1.0 | 0.43 | 0.28 | | | | | | | | |
| Capacity (veh/h) | 548 | 596 | 471 | 432 | | | | | | | | |
| Control Delay (s) | 23.7 | 133.8 | 15.3 | 13.4 | | | | | | | | |
| Approach Delay (s) | 23.7 | 133.8 | 15.3 | 13.4 | | | | | | | | |
| Approach LOS | C | F | C | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 75.7 | | | | | | | | | |
| Level of Service | | | F | | | | | | | | | |
| Intersection Capacity Utilization | | | 65.8% | ICU Level of Service | C | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |























HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2020 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 144 | 306 | 72 | 157 | 541 | 382 | 13 | 764 | 248 | 202 | 280 | 109 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1449 | 1620 | 1739 | 1390 | 1652 | 3240 | 1331 | 1620 | 2940 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1449 | 1620 | 1739 | 1390 | 1652 | 3240 | 1331 | 1620 | 2940 | |
| 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) | 157 | 333 | 78 | 171 | 588 | 415 | 14 | 830 | 270 | 220 | 304 | 118 |
| RTOR Reduction (vph) | 0 | 0 | 62 | 0 | 0 | 197 | 0 | 0 | 82 | 0 | 23 | 0 |
| Lane Group Flow (vph) | 157 | 333 | 16 | 171 | 588 | 218 | 14 | 830 | 188 | 220 | 399 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 17.4 | 25.0 | 25.0 | 18.2 | 25.8 | 25.8 | 3.2 | 37.2 | 37.2 | 22.3 | 56.3 | |
| Effective Green, g (s) | 17.4 | 25.0 | 25.0 | 18.2 | 25.8 | 25.8 | 3.2 | 37.2 | 37.2 | 22.3 | 56.3 | |
| Actuated g/C Ratio | 0.14 | 0.21 | 0.21 | 0.15 | 0.21 | 0.21 | 0.03 | 0.31 | 0.31 | 0.18 | 0.47 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 238 | 360 | 300 | 244 | 371 | 297 | 43 | 998 | 410 | 299 | 1371 | |
| v/s Ratio Prot | 0.10 | 0.19 | | c0.11 | c0.34 | | 0.01 | c0.26 | | c0.14 | 0.14 | |
| v/s Ratio Perm | | | 0.01 | | | 0.16 | | | 0.14 | | | |
| v/c Ratio | 0.66 | 0.93 | 0.05 | 0.70 | 1.58 | 0.74 | 0.33 | 0.83 | 0.46 | 0.74 | 0.29 | |
| Uniform Delay, d1 | 48.8 | 46.9 | 38.4 | 48.7 | 47.5 | 44.3 | 57.7 | 38.8 | 33.6 | 46.4 | 19.9 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.1 | 29.3 | 0.1 | 9.4 | 275.8 | 9.7 | 5.9 | 6.3 | 1.1 | 9.6 | 0.2 | |
| Delay (s) | 56.0 | 76.2 | 38.5 | 58.0 | 323.2 | 54.0 | 63.6 | 45.1 | 34.7 | 56.1 | 20.0 | |
| Level of Service | E | E | D | E | F | D | E | D | C | E | C | |
| Approach Delay (s) | | 65.5 | | | 189.4 | | | 42.8 | | | 32.4 | |
| Approach LOS | | E | | | F | | | D | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 93.8 | | | | | | | | | F |
| HCM 2000 Volume to Capacity ratio | | | 0.98 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.7 | | | | | | | | 18.0 | |
| Intersection Capacity Utilization | | | 83.9% | | | | | | | | | E |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

2020 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  | |  |  |  |  |  |  | |
| Volume (vph) | 43 | 711 | 39 | 891 | 1146 | 242 | 70 | 251 | 519 | 164 | 154 | 34 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 4.0 | 4.0 | 5.5 | 5.5 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4619 | | 3255 | 3146 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4619 | | 3255 | 3146 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 | |
| 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) | 47 | 773 | 42 | 968 | 1246 | 263 | 76 | 273 | 564 | 178 | 167 | 37 | |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | |
| Lane Group Flow (vph) | 47 | 809 | 0 | 968 | 1493 | 0 | 76 | 273 | 564 | 178 | 167 | 8 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 6.0 | 23.0 | | 32.0 | 49.0 | | 13.0 | 25.0 | 61.0 | 11.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 6.0 | 23.0 | | 32.0 | 49.0 | | 13.0 | 25.0 | 61.0 | 11.0 | 23.0 | 23.0 | |
| Actuated g/C Ratio | 0.05 | 0.21 | | 0.29 | 0.45 | | 0.12 | 0.23 | 0.55 | 0.10 | 0.21 | 0.21 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 85 | 965 | | 946 | 1401 | | 198 | 762 | 1500 | 325 | 677 | 307 | |
| v/s Ratio Prot | 0.03 | 0.18 | | c0.30 | c0.47 | | 0.05 | 0.08 | c0.21 | c0.05 | 0.05 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 | |
| v/c Ratio | 0.55 | 0.84 | | 1.02 | 1.07 | | 0.38 | 0.36 | 0.38 | 0.55 | 0.25 | 0.03 | |
| Uniform Delay, d1 | 50.7 | 41.7 | | 39.0 | 30.5 | | 44.8 | 35.8 | 13.8 | 47.1 | 36.3 | 34.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 | 0.61 | 0.17 | 1.01 | 0.71 | 1.00 | |
| Incremental Delay, d2 | 9.3 | 8.7 | | 35.3 | 43.6 | | 5.5 | 0.4 | 0.2 | 6.0 | 0.2 | 0.0 | |
| Delay (s) | 60.0 | 50.4 | | 74.3 | 74.1 | | 49.7 | 22.2 | 2.5 | 53.4 | 25.8 | 34.6 | |
| Level of Service | E | D | | E | E | | D | C | A | D | C | C | |
| Approach Delay (s) | | 50.9 | | | 74.2 | | | 12.3 | | | 39.5 | | |
| Approach LOS | | D | | | E | | | B | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 54.8 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.85 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 84.1% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2020 AM + Project



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑↑↑ | | ↙ | ↑↑ | | ↗ |
| Volume (vph) | 1220 | 14 | 135 | 0 | 0 | 184 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 1.00 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6397 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6397 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1326 | 15 | 147 | 0 | 0 | 200 |
| RTOR Reduction (vph) | 3 | 0 | 0 | 0 | 0 | 38 |
| Lane Group Flow (vph) | 1338 | 0 | 147 | 0 | 0 | 162 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 20.5 | | 6.0 | | | 6.0 |
| Effective Green, g (s) | 20.5 | | 6.0 | | | 6.0 |
| Actuated g/C Ratio | 0.57 | | 0.17 | | | 0.17 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 3642 | | 295 | | | 268 |
| v/s Ratio Prot | c0.21 | | 0.08 | | | c0.10 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.37 | | 0.50 | | | 0.60 |
| Uniform Delay, d1 | 4.2 | | 13.6 | | | 13.9 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.1 | | 1.3 | | | 3.8 |
| Delay (s) | 4.3 | | 15.0 | | | 17.7 |
| Level of Service | A | | B | | | B |
| Approach Delay (s) | 4.3 | | | 15.0 | 17.7 | |
| Approach LOS | A | | | B | B | |

| Intersection Summary | | | |
|--|-------|---------------------------|-----|
| HCM 2000 Control Delay | 6.8 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.42 | | |
| Actuated Cycle Length (s) | 36.0 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 37.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| Description: WBT Removed as they are not part of signalized intersection | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020 AM + Project



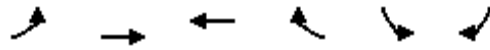
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|-------|-------|-------|---------------------------|------|------|------|------|-------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1037 | 547 | 396 | 1454 | 0 | 0 | 0 | 458 | 0 | 0 | 1074 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 1127 | 595 | 430 | 1580 | 0 | 0 | 0 | 498 | 0 | 0 | 1167 |
| RTOR Reduction (vph) | 0 | 0 | 358 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| Lane Group Flow (vph) | 0 | 1127 | 237 | 430 | 1580 | 0 | 0 | 0 | 498 | 0 | 0 | 1116 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 35.0 | 35.0 | 12.9 | 54.9 | | | | 26.5 | | | 26.5 |
| Effective Green, g (s) | | 35.0 | 35.0 | 12.9 | 54.9 | | | | 26.5 | | | 26.5 |
| Actuated g/C Ratio | | 0.40 | 0.40 | 0.15 | 0.62 | | | | 0.30 | | | 0.30 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1335 | 1051 | 461 | 2095 | | | | 878 | | | 840 |
| v/s Ratio Prot | | 0.34 | | c0.14 | c0.47 | | | | 0.17 | | | c0.40 |
| v/s Ratio Perm | | | 0.09 | | | | | | | | | |
| v/c Ratio | | 0.84 | 0.23 | 0.93 | 0.75 | | | | 0.57 | | | 1.33 |
| Uniform Delay, d1 | | 24.0 | 17.5 | 37.1 | 11.7 | | | | 25.9 | | | 30.7 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 5.1 | 0.1 | 25.9 | 1.6 | | | | 0.8 | | | 156.1 |
| Delay (s) | | 29.0 | 17.6 | 63.0 | 13.3 | | | | 26.7 | | | 186.8 |
| Level of Service | | C | B | E | B | | | | C | | | F |
| Approach Delay (s) | | 25.1 | | | 23.9 | | | 26.7 | | | 186.8 | |
| Approach LOS | | C | | | C | | | C | | | F | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 59.8 | | | HCM 2000 Level of Service | | | E | | | |
| HCM 2000 Volume to Capacity ratio | | | 1.04 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 87.9 | | | Sum of lost time (s) | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 84.8% | | | ICU Level of Service | | | E | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps

2020 AM + Project



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|-------|------|-------|------|---------------------------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 532 | 0 | 855 | 426 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 578 | 0 | 929 | 463 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 131 | 0 | 0 |
| Lane Group Flow (vph) | 578 | 0 | 929 | 332 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 24.0 | | 21.8 | 21.8 | | |
| Effective Green, g (s) | 24.0 | | 21.8 | 21.8 | | |
| Actuated g/C Ratio | 0.44 | | 0.40 | 0.40 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 709 | | 1334 | 609 | | |
| v/s Ratio Prot | c0.36 | | c0.28 | | | |
| v/s Ratio Perm | | | | 0.22 | | |
| v/c Ratio | 0.82 | | 0.70 | 0.54 | | |
| Uniform Delay, d1 | 13.5 | | 13.7 | 12.7 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 7.2 | | 1.6 | 1.0 | | |
| Delay (s) | 20.6 | | 15.3 | 13.7 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 20.6 | 14.8 | | 0.0 | |
| Approach LOS | | C | B | | A | |
| Intersection Summary | | | | | | |
| HCM 2000 Control Delay | | | 16.5 | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.76 | | | |
| Actuated Cycle Length (s) | | | 54.8 | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 63.4% | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | |
| c Critical Lane Group | | | | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd
























2020 AM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|-------|------|-------|---------------------------|-------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 136 | 854 | 395 | 137 | 912 | 35 | 199 | 33 | 72 | 18 | 83 | 109 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4625 | | 1539 | 1564 | 1513 | | 1750 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4625 | | 1539 | 1564 | 1513 | | 1750 | 1489 |
| 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) | 148 | 928 | 429 | 149 | 991 | 38 | 216 | 36 | 78 | 20 | 90 | 118 |
| RTOR Reduction (vph) | 0 | 0 | 258 | 0 | 4 | 0 | 0 | 0 | 64 | 0 | 0 | 108 |
| Lane Group Flow (vph) | 148 | 928 | 171 | 149 | 1025 | 0 | 125 | 127 | 14 | 0 | 110 | 10 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 14.1 | 37.8 | 37.8 | 13.7 | 37.4 | | 16.5 | 16.5 | 16.5 | | 7.8 | 7.8 |
| Effective Green, g (s) | 14.1 | 37.8 | 37.8 | 13.7 | 37.4 | | 16.5 | 16.5 | 16.5 | | 7.8 | 7.8 |
| Actuated g/C Ratio | 0.15 | 0.40 | 0.40 | 0.14 | 0.39 | | 0.17 | 0.17 | 0.17 | | 0.08 | 0.08 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 240 | 1852 | 609 | 241 | 1820 | | 267 | 271 | 262 | | 143 | 122 |
| v/s Ratio Prot | c0.09 | 0.20 | | 0.09 | c0.22 | | c0.08 | 0.08 | | | c0.06 | 0.01 |
| v/s Ratio Perm | | | 0.11 | | | | | | 0.01 | | | |
| v/c Ratio | 0.62 | 0.50 | 0.28 | 0.62 | 0.56 | | 0.47 | 0.47 | 0.05 | | 0.77 | 0.08 |
| Uniform Delay, d1 | 37.9 | 21.5 | 19.4 | 38.2 | 22.4 | | 35.3 | 35.3 | 32.7 | | 42.7 | 40.3 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.80 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 5.3 | 1.0 | 1.1 | 4.7 | 1.1 | | 1.8 | 1.7 | 0.1 | | 22.8 | 0.4 |
| Delay (s) | 43.2 | 22.5 | 20.5 | 40.9 | 19.0 | | 37.1 | 37.1 | 32.8 | | 65.6 | 40.7 |
| Level of Service | D | C | C | D | B | | D | D | C | | E | D |
| Approach Delay (s) | | 24.0 | | | 21.8 | | | 36.1 | | | 52.7 | |
| Approach LOS | | C | | | C | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 26.4 | | | HCM 2000 Level of Service | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.57 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | | | Sum of lost time (s) | | | 19.2 | | | |
| Intersection Capacity Utilization | | | 54.5% | | | ICU Level of Service | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

2020 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  | |  |  |  |  |  |  |
| Volume (vph) | 54 | 556 | 223 | 147 | 764 | 14 | 227 | 168 | 397 | 20 | 167 | 43 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3280 | | 3143 | 3240 | 1660 | 3204 | 3127 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3280 | | 3143 | 3240 | 1660 | 3204 | 3127 | |
| 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) | 59 | 604 | 242 | 160 | 830 | 15 | 247 | 183 | 432 | 22 | 182 | 47 |
| RTOR Reduction (vph) | 0 | 0 | 154 | 0 | 1 | 0 | 0 | 0 | 300 | 0 | 26 | 0 |
| Lane Group Flow (vph) | 59 | 604 | 88 | 160 | 844 | 0 | 247 | 183 | 132 | 22 | 203 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 6.5 | 34.7 | 34.7 | 14.5 | 42.7 | | 12.4 | 26.1 | 26.1 | 1.7 | 15.8 | |
| Effective Green, g (s) | 6.5 | 34.7 | 34.7 | 14.5 | 42.7 | | 12.4 | 26.1 | 26.1 | 1.7 | 15.8 | |
| Actuated g/C Ratio | 0.07 | 0.37 | 0.37 | 0.15 | 0.45 | | 0.13 | 0.27 | 0.27 | 0.02 | 0.17 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 110 | 1206 | 548 | 252 | 1474 | | 410 | 890 | 456 | 57 | 520 | |
| v/s Ratio Prot | 0.04 | 0.18 | | c0.10 | c0.26 | | c0.08 | 0.06 | | 0.01 | c0.06 | |
| v/s Ratio Perm | | | 0.06 | | | | | | 0.08 | | | |
| v/c Ratio | 0.54 | 0.50 | 0.16 | 0.63 | 0.57 | | 0.60 | 0.21 | 0.29 | 0.39 | 0.39 | |
| Uniform Delay, d1 | 42.8 | 23.4 | 20.3 | 37.8 | 19.4 | | 39.0 | 26.5 | 27.1 | 46.1 | 35.3 | |
| Progression Factor | 1.32 | 0.61 | 2.49 | 1.24 | 0.56 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 1.3 | 0.6 | 0.5 | 0.1 | | 2.9 | 0.2 | 0.5 | 5.8 | 0.7 | |
| Delay (s) | 58.8 | 15.6 | 51.2 | 47.3 | 11.1 | | 41.9 | 26.6 | 27.6 | 52.0 | 36.0 | |
| Level of Service | E | B | D | D | B | | D | C | C | D | D | |
| Approach Delay (s) | | 28.0 | | | 16.9 | | | 31.5 | | | 37.4 | |
| Approach LOS | | C | | | B | | | C | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 26.1 | | | | HCM 2000 Level of Service | | | C | | |
| HCM 2000 Volume to Capacity ratio | | | 0.57 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | | | | Sum of lost time (s) | | | 18.0 | | |
| Intersection Capacity Utilization | | | 55.2% | | | | ICU Level of Service | | | B | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 329 | 251 | 373 | 9 | 292 | 78 | 451 | 1047 | 8 | 47 | 487 | 183 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1736 | 1480 | 1652 | 3534 | | 1652 | 3152 | |
| Flt Permitted | 0.19 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 325 | 1739 | 1770 | | 1716 | 1480 | 1652 | 3534 | | 1652 | 3152 | |
| 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) | 358 | 273 | 405 | 10 | 317 | 85 | 490 | 1138 | 9 | 51 | 529 | 199 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 66 | 0 | 1 | 0 | 0 | 41 | 0 |
| Lane Group Flow (vph) | 358 | 273 | 405 | 0 | 327 | 19 | 490 | 1146 | 0 | 51 | 687 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 39.2 | 39.2 | 95.0 | | 20.7 | 20.7 | 21.8 | 34.2 | | 7.1 | 19.0 | |
| Effective Green, g (s) | 39.2 | 39.2 | 95.0 | | 20.7 | 20.7 | 21.8 | 34.2 | | 7.1 | 19.0 | |
| Actuated g/C Ratio | 0.41 | 0.41 | 1.00 | | 0.22 | 0.22 | 0.23 | 0.36 | | 0.07 | 0.20 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 336 | 717 | 1770 | | 373 | 322 | 379 | 1272 | | 123 | 630 | |
| v/s Ratio Prot | c0.16 | 0.16 | | | | | c0.30 | 0.32 | | 0.03 | c0.22 | |
| v/s Ratio Perm | c0.28 | | 0.23 | | 0.19 | 0.01 | | | | | | |
| v/c Ratio | 1.07 | 0.38 | 0.23 | | 0.88 | 0.06 | 1.29 | 0.90 | | 0.41 | 1.09 | |
| Uniform Delay, d1 | 23.3 | 19.4 | 0.0 | | 35.9 | 29.4 | 36.6 | 28.8 | | 42.0 | 38.0 | |
| Progression Factor | 0.93 | 0.83 | 1.00 | | 1.00 | 1.00 | 1.10 | 0.76 | | 0.88 | 0.89 | |
| Incremental Delay, d2 | 64.7 | 0.4 | 0.3 | | 20.5 | 0.1 | 149.8 | 10.2 | | 2.2 | 62.4 | |
| Delay (s) | 86.4 | 16.5 | 0.3 | | 56.4 | 29.5 | 190.0 | 32.1 | | 39.0 | 96.0 | |
| Level of Service | F | B | A | | E | C | F | C | | D | F | |
| Approach Delay (s) | | 34.3 | | | 50.9 | | | 79.4 | | | 92.3 | |
| Approach LOS | | C | | | D | | | E | | | F | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 66.8 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.17 | | |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 96.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

2020 AM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 120 | 44 | 141 | 68 | 113 | 486 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 130 | 48 | 153 | 74 | 123 | 528 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 178 | 227 | 651 | | | |
| Volume Left (vph) | 130 | 153 | 0 | | | |
| Volume Right (vph) | 48 | 0 | 528 | | | |
| Hadj (s) | 0.02 | 0.17 | -0.45 | | | |
| Departure Headway (s) | 5.9 | 5.4 | 4.3 | | | |
| Degree Utilization, x | 0.29 | 0.34 | 0.78 | | | |
| Capacity (veh/h) | 562 | 636 | 814 | | | |
| Control Delay (s) | 11.3 | 11.1 | 21.2 | | | |
| Approach Delay (s) | 11.3 | 11.1 | 21.2 | | | |
| Approach LOS | B | B | C | | | |
| Intersection Summary | | | | | | |
| Delay | | | 17.4 | | | |
| Level of Service | | | C | | | |
| Intersection Capacity Utilization | | | 66.6% | ICU Level of Service | C | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

2020 AM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 24 | 8 | 20 | 184 | 138 | 17 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 26 | 9 | 22 | 200 | 150 | 18 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 35 | 222 | 168 | | | |
| Volume Left (vph) | 26 | 22 | 0 | | | |
| Volume Right (vph) | 9 | 0 | 18 | | | |
| Hadj (s) | 0.03 | 0.05 | -0.03 | | | |
| Departure Headway (s) | 4.8 | 4.2 | 4.2 | | | |
| Degree Utilization, x | 0.05 | 0.26 | 0.20 | | | |
| Capacity (veh/h) | 689 | 837 | 846 | | | |
| Control Delay (s) | 8.0 | 8.7 | 8.2 | | | |
| Approach Delay (s) | 8.0 | 8.7 | 8.2 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.4 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 32.4% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive


















2020 AM + Project



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|-------|-------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 72 | 156 | 71 | 42 | 51 | 94 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 78 | 170 | 77 | 46 | 55 | 102 |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 248 | 123 | 158 | | | |
| Volume Left (vph) | 78 | 0 | 55 | | | |
| Volume Right (vph) | 170 | 46 | 0 | | | |
| Hadj (s) | -0.31 | -0.19 | 0.10 | | | |
| Departure Headway (s) | 4.3 | 4.5 | 4.7 | | | |
| Degree Utilization, x | 0.29 | 0.15 | 0.21 | | | |
| Capacity (veh/h) | 797 | 754 | 717 | | | |
| Control Delay (s) | 9.0 | 8.3 | 8.9 | | | |
| Approach Delay (s) | 9.0 | 8.3 | 8.9 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.8 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 34.7% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2020 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | | |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | | Stop |
| Volume (vph) | 13 | 206 | 13 | 15 | 222 | 34 | 17 | 62 | 46 | 30 | 17 | 9 |
| 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 |
| Hourly flow rate (vph) | 14 | 224 | 14 | 16 | 241 | 37 | 18 | 67 | 50 | 33 | 18 | 10 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 14 | 238 | 295 | 136 | 61 | | | | | | | |
| Volume Left (vph) | 14 | 0 | 16 | 18 | 33 | | | | | | | |
| Volume Right (vph) | 0 | 14 | 37 | 50 | 10 | | | | | | | |
| Hadj (s) | 0.53 | -0.01 | -0.03 | -0.16 | 0.04 | | | | | | | |
| Departure Headway (s) | 5.9 | 5.3 | 4.9 | 5.2 | 5.5 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.35 | 0.40 | 0.20 | 0.09 | | | | | | | |
| Capacity (veh/h) | 589 | 647 | 708 | 616 | 570 | | | | | | | |
| Control Delay (s) | 7.8 | 10.0 | 11.0 | 9.5 | 9.1 | | | | | | | |
| Approach Delay (s) | 9.9 | | 11.0 | 9.5 | 9.1 | | | | | | | |
| Approach LOS | A | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.2 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 41.8% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
23: Doolittle Dr & Fairway Drive/Fairway Dr

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 113 | 114 | 63 | 47 | 148 | 293 | 100 | 536 | 47 | 113 | 307 | 40 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1690 | 1260 | 1620 | 1739 | 1318 | 1711 | 3035 | | 1620 | 3023 | |
| Flt Permitted | | 0.76 | 1.00 | 0.56 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1318 | 1260 | 947 | 1739 | 1318 | 1711 | 3035 | | 1620 | 3023 | |
| 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) | 123 | 124 | 68 | 51 | 161 | 318 | 109 | 583 | 51 | 123 | 334 | 43 |
| RTOR Reduction (vph) | 0 | 0 | 48 | 0 | 0 | 224 | 0 | 9 | 0 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 0 | 247 | 20 | 51 | 161 | 94 | 109 | 625 | 0 | 123 | 363 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 7.4 | 17.2 | | 8.0 | 17.8 | |
| Effective Green, g (s) | | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 7.4 | 17.2 | | 8.0 | 17.8 | |
| Actuated g/C Ratio | | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.13 | 0.30 | | 0.14 | 0.31 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 388 | 371 | 279 | 512 | 388 | 222 | 915 | | 227 | 944 | |
| v/s Ratio Prot | | | | | 0.09 | | 0.06 | c0.21 | | c0.08 | 0.12 | |
| v/s Ratio Perm | | c0.19 | 0.02 | 0.05 | | 0.07 | | | | | | |
| v/c Ratio | | 0.64 | 0.05 | 0.18 | 0.31 | 0.24 | 0.49 | 0.68 | | 0.54 | 0.38 | |
| Uniform Delay, d1 | | 17.4 | 14.4 | 15.0 | 15.6 | 15.3 | 23.0 | 17.5 | | 22.8 | 15.3 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 3.4 | 0.1 | 0.3 | 0.4 | 0.3 | 1.7 | 2.3 | | 2.6 | 0.4 | |
| Delay (s) | | 20.9 | 14.5 | 15.3 | 16.0 | 15.6 | 24.8 | 19.8 | | 25.4 | 15.7 | |
| Level of Service | | C | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 19.5 | | | 15.7 | | | 20.5 | | | 18.1 | |
| Approach LOS | | B | | | B | | | C | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 57.0 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 64.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 129 | 144 | 54 | 164 | 342 | 55 | 138 | 566 | 153 | 61 | 421 | 97 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3121 | | 1593 | 3135 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3121 | | 1593 | 3135 | |
| 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) | 140 | 157 | 59 | 178 | 372 | 60 | 150 | 615 | 166 | 66 | 458 | 105 |
| RTOR Reduction (vph) | 0 | 0 | 46 | 0 | 0 | 45 | 0 | 20 | 0 | 0 | 18 | 0 |
| Lane Group Flow (vph) | 140 | 157 | 13 | 178 | 372 | 15 | 150 | 761 | 0 | 66 | 545 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 14.3 | 24.0 | 24.0 | 17.6 | 27.3 | 27.3 | 20.0 | 42.0 | | 7.4 | 29.4 | |
| Effective Green, g (s) | 14.3 | 24.0 | 24.0 | 17.6 | 27.3 | 27.3 | 20.0 | 42.0 | | 7.4 | 29.4 | |
| Actuated g/C Ratio | 0.13 | 0.22 | 0.22 | 0.16 | 0.25 | 0.25 | 0.18 | 0.38 | | 0.07 | 0.27 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 205 | 402 | 284 | 254 | 462 | 335 | 300 | 1191 | | 107 | 837 | |
| v/s Ratio Prot | 0.09 | 0.09 | | c0.11 | c0.20 | | 0.09 | c0.24 | | 0.04 | c0.17 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.68 | 0.39 | 0.05 | 0.70 | 0.81 | 0.04 | 0.50 | 0.64 | | 0.62 | 0.65 | |
| Uniform Delay, d1 | 45.7 | 36.7 | 34.0 | 43.7 | 38.9 | 31.4 | 40.5 | 27.8 | | 49.9 | 35.8 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 0.92 | | 0.74 | 0.45 | |
| Incremental Delay, d2 | 9.8 | 0.9 | 0.1 | 9.0 | 10.4 | 0.1 | 1.7 | 2.5 | | 11.1 | 3.8 | |
| Delay (s) | 55.5 | 37.6 | 34.0 | 52.7 | 49.2 | 31.5 | 39.4 | 28.0 | | 48.0 | 20.0 | |
| Level of Service | E | D | C | D | D | C | D | C | | D | C | |
| Approach Delay (s) | | 44.0 | | | 48.5 | | | 29.8 | | | 22.9 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 34.6 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.74 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 67.4% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|--------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 38 | 267 | 7 | 6 | 529 | 202 | 2 | 0 | 0 | 39 | 0 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | | 1.00 |
| Frt | 1.00 | 1.00 | | | 0.96 | | | 1.00 | | 1.00 | | 0.85 |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.95 | | 0.95 | | 1.00 |
| Satd. Flow (prot) | 1770 | 1855 | | | 3392 | | | 1770 | | 1770 | | 1583 |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.95 | | 0.76 | | 1.00 |
| Satd. Flow (perm) | 1770 | 1855 | | | 3233 | | | 1770 | | 1409 | | 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) | 41 | 290 | 8 | 7 | 575 | 220 | 2 | 0 | 0 | 42 | 0 | 27 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| Lane Group Flow (vph) | 41 | 297 | 0 | 0 | 752 | 0 | 0 | 2 | 0 | 42 | 0 | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | |
| Permitted Phases | | | | | | | 8 | | | 4 | | 4 |
| Actuated Green, G (s) | 2.3 | 37.3 | | | 30.1 | | | 6.6 | | 6.6 | | 6.6 |
| Effective Green, g (s) | 2.3 | 37.3 | | | 30.1 | | | 6.6 | | 6.6 | | 6.6 |
| Actuated g/C Ratio | 0.04 | 0.71 | | | 0.57 | | | 0.12 | | 0.12 | | 0.12 |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Grp Cap (vph) | 77 | 1310 | | | 1843 | | | 221 | | 176 | | 197 |
| v/s Ratio Prot | c0.02 | 0.16 | | | | | | | | | | |
| v/s Ratio Perm | | | | | c0.23 | | | 0.00 | | c0.03 | | 0.00 |
| v/c Ratio | 0.53 | 0.23 | | | 1.90dr | | | 0.01 | | 0.24 | | 0.02 |
| Uniform Delay, d1 | 24.7 | 2.7 | | | 6.4 | | | 20.2 | | 20.8 | | 20.3 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | | 1.00 |
| Incremental Delay, d2 | 3.5 | 0.1 | | | 0.2 | | | 0.0 | | 1.0 | | 0.0 |
| Delay (s) | 28.2 | 2.8 | | | 6.6 | | | 20.3 | | 21.8 | | 20.3 |
| Level of Service | C | A | | | A | | | C | | C | | C |
| Approach Delay (s) | | 5.9 | | | 6.6 | | | 20.3 | | | 21.2 | |
| Approach LOS | | A | | | A | | | C | | | C | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 7.2 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 52.8 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 42.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
26: Miller St & Fairway Dr/Aladdin Ave

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 31 | 316 | 31 | 72 | 788 | 203 | 12 | 1 | 12 | 39 | 2 | 18 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 0.86 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1834 | | 1593 | 1926 | | 1711 | 1550 | | 1770 | 1609 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1834 | | 1593 | 1926 | | 1801 | 1550 | | 1770 | 1609 | |
| 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) | 34 | 343 | 34 | 78 | 857 | 221 | 13 | 1 | 13 | 42 | 2 | 20 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 12 | 0 | 0 | 17 | 0 |
| Lane Group Flow (vph) | 34 | 375 | 0 | 78 | 1073 | 0 | 13 | 2 | 0 | 42 | 5 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 2.3 | 40.9 | | 5.6 | 44.2 | | 3.3 | 3.3 | | 2.5 | 9.8 | |
| Effective Green, g (s) | 2.3 | 40.9 | | 5.6 | 44.2 | | 3.3 | 3.3 | | 2.5 | 9.8 | |
| Actuated g/C Ratio | 0.03 | 0.58 | | 0.08 | 0.63 | | 0.05 | 0.05 | | 0.04 | 0.14 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 58 | 1070 | | 127 | 1214 | | 84 | 72 | | 63 | 224 | |
| v/s Ratio Prot | 0.02 | 0.20 | | c0.05 | c0.56 | | | 0.00 | | c0.02 | 0.00 | |
| v/s Ratio Perm | | | | | | | c0.01 | | | | | |
| v/c Ratio | 0.59 | 0.35 | | 0.61 | 0.88 | | 0.15 | 0.02 | | 0.67 | 0.02 | |
| Uniform Delay, d1 | 33.4 | 7.6 | | 31.2 | 10.8 | | 32.1 | 31.9 | | 33.4 | 26.0 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 9.4 | 0.3 | | 6.1 | 8.1 | | 1.2 | 0.2 | | 18.7 | 0.1 | |
| Delay (s) | 42.8 | 7.9 | | 37.3 | 18.9 | | 33.2 | 32.0 | | 52.1 | 26.1 | |
| Level of Service | D | A | | D | B | | C | C | | D | C | |
| Approach Delay (s) | | 10.8 | | | 20.2 | | | 32.6 | | | 43.1 | |
| Approach LOS | | B | | | C | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.9 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.84 | | |
| Actuated Cycle Length (s) | 70.1 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 76.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

27: Teagarden St & Aladdin Ave

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | |
| Volume (vph) | 39 | 234 | 68 | 10 | 694 | 40 | 95 | 111 | 11 | 75 | 152 | 195 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1952 | | 1711 | 1707 | | 1652 | 1833 | | 1644 | 1740 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.34 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1952 | | 1711 | 1707 | | 593 | 1833 | | 1163 | 1740 | |
| 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) | 42 | 254 | 74 | 11 | 754 | 43 | 103 | 121 | 12 | 82 | 165 | 212 |
| RTOR Reduction (vph) | 0 | 13 | 0 | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 66 | 0 |
| Lane Group Flow (vph) | 42 | 315 | 0 | 11 | 795 | 0 | 103 | 128 | 0 | 82 | 311 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 14 | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 3.0 | 25.7 | | 1.2 | 23.9 | | 16.6 | 16.6 | | 16.6 | 16.6 | |
| Effective Green, g (s) | 3.0 | 25.7 | | 1.2 | 23.9 | | 16.6 | 16.6 | | 16.6 | 16.6 | |
| Actuated g/C Ratio | 0.05 | 0.45 | | 0.02 | 0.42 | | 0.29 | 0.29 | | 0.29 | 0.29 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 90 | 887 | | 36 | 722 | | 174 | 538 | | 341 | 511 | |
| v/s Ratio Prot | c0.02 | 0.16 | | 0.01 | c0.47 | | | 0.07 | | | c0.18 | |
| v/s Ratio Perm | | | | | | | 0.17 | | | 0.07 | | |
| v/c Ratio | 0.47 | 0.36 | | 0.31 | 1.10 | | 0.59 | 0.24 | | 0.24 | 0.61 | |
| Uniform Delay, d1 | 26.0 | 10.0 | | 27.2 | 16.3 | | 17.1 | 15.1 | | 15.2 | 17.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.1 | 0.3 | | 6.5 | 64.5 | | 6.2 | 0.3 | | 0.5 | 2.4 | |
| Delay (s) | 31.1 | 10.3 | | 33.7 | 80.8 | | 23.2 | 15.5 | | 15.7 | 19.5 | |
| Level of Service | C | B | | C | F | | C | B | | B | B | |
| Approach Delay (s) | | 12.7 | | | 80.1 | | | 18.9 | | | 18.9 | |
| Approach LOS | | B | | | F | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 44.1 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.87 | | |
| Actuated Cycle Length (s) | 56.5 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 75.5% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 172 | 17 | 80 | 2 | 12 | 10 | 559 | 725 | 15 | 7 | 242 | 193 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.88 | | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1546 | | 1652 | 1603 | | 1652 | 3240 | 1442 | 1711 | 3159 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1546 | | 1652 | 1603 | | 1652 | 3240 | 1442 | 1711 | 3159 | |
| 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) | 187 | 18 | 87 | 2 | 13 | 11 | 608 | 788 | 16 | 8 | 263 | 210 |
| RTOR Reduction (vph) | 0 | 65 | 0 | 0 | 9 | 0 | 0 | 0 | 7 | 0 | 121 | 0 |
| Lane Group Flow (vph) | 187 | 40 | 0 | 2 | 15 | 0 | 608 | 788 | 9 | 8 | 352 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | 0 | 0 | | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 13.1 | 27.0 | | 0.7 | 14.6 | | 40.4 | 60.5 | 60.5 | 0.7 | 20.8 | |
| Effective Green, g (s) | 13.1 | 27.0 | | 0.7 | 14.6 | | 40.4 | 60.5 | 60.5 | 0.7 | 20.8 | |
| Actuated g/C Ratio | 0.12 | 0.26 | | 0.01 | 0.14 | | 0.38 | 0.57 | 0.57 | 0.01 | 0.20 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 205 | 396 | | 10 | 222 | | 633 | 1859 | 827 | 11 | 623 | |
| v/s Ratio Prot | c0.11 | c0.03 | | 0.00 | 0.01 | | c0.37 | 0.24 | | 0.00 | c0.11 | |
| v/s Ratio Perm | | | | | | | | | 0.01 | | | |
| v/c Ratio | 0.91 | 0.10 | | 0.20 | 0.07 | | 0.96 | 0.42 | 0.01 | 0.73 | 0.56 | |
| Uniform Delay, d1 | 45.6 | 29.9 | | 52.1 | 39.5 | | 31.7 | 12.6 | 9.6 | 52.3 | 38.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 40.8 | 0.2 | | 19.6 | 0.3 | | 26.6 | 0.3 | 0.0 | 141.7 | 1.9 | |
| Delay (s) | 86.4 | 30.2 | | 71.7 | 39.7 | | 58.3 | 13.0 | 9.6 | 194.0 | 40.1 | |
| Level of Service | F | C | | E | D | | E | B | A | F | D | |
| Approach Delay (s) | | 66.2 | | | 42.2 | | | 32.5 | | | 42.7 | |
| Approach LOS | | E | | | D | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 39.3 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.72 | | |
| Actuated Cycle Length (s) | 105.4 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 70.9% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

29: Merced Street/Merced St & Wells Fargo driveway

2020 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↗ | ↖ | ↕↕↕ | | ↖ | ↕↕ | |
| Volume (vph) | 3 | 2 | 0 | 5 | 0 | 15 | 4 | 853 | 7 | 40 | 1040 | 5 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1808 | | | 1562 | 1397 | 1650 | 4947 | | 1617 | 3469 | |
| Flt Permitted | | 0.86 | | | 0.75 | 1.00 | 0.24 | 1.00 | | 0.29 | 1.00 | |
| Satd. Flow (perm) | | 1606 | | | 1241 | 1397 | 420 | 4947 | | 500 | 3469 | |
| 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) | 3 | 2 | 0 | 5 | 0 | 16 | 4 | 927 | 8 | 43 | 1130 | 5 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 5 | 0 | 0 | 5 | 1 | 4 | 935 | 0 | 43 | 1135 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Effective Green, g (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | 0.06 | 0.86 | 0.86 | | 0.86 | 0.86 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 103 | | | 80 | 90 | 360 | 4240 | | 428 | 2973 | |
| v/s Ratio Prot | | | | | | | | 0.19 | | | c0.33 | |
| v/s Ratio Perm | | 0.00 | | | c0.00 | 0.00 | 0.01 | | | 0.09 | | |
| v/c Ratio | | 0.05 | | | 0.06 | 0.01 | 0.01 | 0.22 | | 0.10 | 0.38 | |
| Uniform Delay, d1 | | 48.3 | | | 48.3 | 48.2 | 1.1 | 1.4 | | 1.2 | 1.7 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.21 | 0.19 | | 0.04 | 0.21 | |
| Incremental Delay, d2 | | 0.2 | | | 0.3 | 0.1 | 0.1 | 0.1 | | 0.2 | 0.2 | |
| Delay (s) | | 48.5 | | | 48.7 | 48.2 | 0.3 | 0.4 | | 0.2 | 0.5 | |
| Level of Service | | D | | | D | D | A | A | | A | A | |
| Approach Delay (s) | | 48.5 | | | 48.3 | | | 0.4 | | | 0.5 | |
| Approach LOS | | D | | | D | | | A | | | A | |





















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 1.0 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.36 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 45.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 30: Merced Street & Republic Ave

2020 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|----------------------|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  | | | |
| Volume (vph) | 32 | 2 | 8 | 37 | 5 | 198 | 9 | 785 | 57 | 339 | 843 | 7 | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | | |
| Flt Protected | | 0.96 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (prot) | | 1707 | | | 1783 | 2787 | 1736 | 3471 | 1583 | 3433 | 3466 | | | |
| Flt Permitted | | 0.75 | | | 0.79 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (perm) | | 1325 | | | 1470 | 2787 | 1736 | 3471 | 1583 | 3433 | 3466 | | | |
| 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) | 35 | 2 | 9 | 40 | 5 | 215 | 10 | 853 | 62 | 368 | 916 | 8 | | |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 0 | 197 | 0 | 0 | 31 | 0 | 0 | 0 | | |
| Lane Group Flow (vph) | 0 | 38 | 0 | 0 | 45 | 18 | 10 | 853 | 31 | 368 | 924 | 0 | | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | | |
| Actuated Green, G (s) | | 9.0 | | | 9.0 | 9.0 | 1.5 | 52.4 | 52.4 | 35.1 | 86.0 | | | |
| Effective Green, g (s) | | 9.0 | | | 9.0 | 9.0 | 1.5 | 52.4 | 52.4 | 35.1 | 86.0 | | | |
| Actuated g/C Ratio | | 0.08 | | | 0.08 | 0.08 | 0.01 | 0.48 | 0.48 | 0.32 | 0.78 | | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | | 108 | | | 120 | 228 | 23 | 1653 | 754 | 1095 | 2709 | | | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.25 | | 0.11 | c0.27 | | | |
| v/s Ratio Perm | | 0.03 | | | c0.03 | 0.01 | | | 0.02 | | | | | |
| v/c Ratio | | 0.35 | | | 0.38 | 0.08 | 0.43 | 0.52 | 0.04 | 0.34 | 0.34 | | | |
| Uniform Delay, d1 | | 47.7 | | | 47.8 | 46.7 | 53.8 | 20.0 | 15.4 | 28.6 | 3.6 | | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.28 | 0.31 | 0.02 | 0.33 | 0.15 | | | |
| Incremental Delay, d2 | | 2.0 | | | 2.0 | 0.1 | 11.0 | 1.0 | 0.1 | 0.2 | 0.3 | | | |
| Delay (s) | | 49.7 | | | 49.8 | 46.8 | 80.1 | 7.3 | 0.4 | 9.6 | 0.9 | | | |
| Level of Service | | D | | | D | D | F | A | A | A | A | | | |
| Approach Delay (s) | | 49.7 | | | 47.3 | | | 7.6 | | | 3.4 | | | |
| Approach LOS | | D | | | D | | | A | | | A | | | |
| Intersection Summary | | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 10.3 | | | | | | | | | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | | | 0.45 | | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 51.7% | | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

2020 AM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 14 | 4 | 30 | 836 | 571 | 55 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3195 | |
| Flt Permitted | 0.95 | 1.00 | 0.39 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 683 | 3240 | 3195 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 15 | 4 | 33 | 909 | 621 | 60 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 7 | 0 |
| Lane Group Flow (vph) | 15 | 0 | 33 | 909 | 674 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Effective Green, g (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Actuated g/C Ratio | 0.08 | 0.08 | 0.76 | 0.76 | 0.76 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 129 | 103 | 517 | 2456 | 2422 | |
| v/s Ratio Prot | c0.01 | | | c0.28 | 0.21 | |
| v/s Ratio Perm | | 0.00 | 0.05 | | | |
| v/c Ratio | 0.12 | 0.00 | 0.06 | 0.37 | 0.28 | |
| Uniform Delay, d1 | 23.6 | 23.4 | 1.7 | 2.2 | 2.0 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.06 | |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.2 | 0.4 | 0.2 | |
| Delay (s) | 24.0 | 23.4 | 1.9 | 2.7 | 0.4 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.6 | 0.4 | |
| Approach LOS | C | | | A | A | |

Intersection Summary
























| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 1.9 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.35 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2020 + Project PM

HCM Signalized Intersection Capacity Analysis
1: Doolittle Dr & Davis St

2020 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 44 | 91 | 22 | 224 | 73 | 485 | 13 | 453 | 381 | 780 | 729 | 20 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3097 | | 3255 | 1689 | 1493 | 1620 | 4655 | 1435 | 3143 | 3224 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3097 | | 3255 | 1689 | 1493 | 1620 | 4655 | 1435 | 3143 | 3224 | |
| 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) | 48 | 99 | 24 | 243 | 79 | 527 | 14 | 492 | 414 | 848 | 792 | 22 |
| RTOR Reduction (vph) | 0 | 20 | 0 | 0 | 0 | 147 | 0 | 0 | 229 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 48 | 103 | 0 | 243 | 79 | 380 | 14 | 492 | 185 | 848 | 813 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 4.7 | 13.1 | | 11.0 | 19.4 | 47.0 | 4.5 | 20.5 | 31.5 | 27.6 | 43.6 | |
| Effective Green, g (s) | 4.7 | 13.1 | | 11.0 | 19.4 | 47.0 | 4.5 | 20.5 | 31.5 | 27.6 | 43.6 | |
| Actuated g/C Ratio | 0.05 | 0.15 | | 0.13 | 0.22 | 0.54 | 0.05 | 0.23 | 0.36 | 0.32 | 0.50 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 90 | 463 | | 409 | 374 | 801 | 83 | 1090 | 516 | 991 | 1606 | |
| v/s Ratio Prot | 0.03 | 0.03 | | c0.07 | 0.05 | c0.15 | 0.01 | c0.11 | 0.04 | c0.27 | c0.25 | |
| v/s Ratio Perm | | | | | | 0.11 | | | 0.08 | | | |
| v/c Ratio | 0.53 | 0.22 | | 0.59 | 0.21 | 0.47 | 0.17 | 0.45 | 0.36 | 0.86 | 0.51 | |
| Uniform Delay, d1 | 40.3 | 32.7 | | 36.1 | 27.8 | 12.6 | 39.7 | 28.7 | 20.6 | 28.1 | 14.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.0 | 0.2 | | 1.5 | 0.3 | 0.2 | 0.4 | 0.4 | 0.2 | 7.1 | 0.4 | |
| Delay (s) | 43.4 | 33.0 | | 37.7 | 28.1 | 12.7 | 40.1 | 29.1 | 20.7 | 35.2 | 15.2 | |
| Level of Service | D | C | | D | C | B | D | C | C | D | B | |
| Approach Delay (s) | | 35.9 | | | 21.3 | | | 25.5 | | | 25.4 | |
| Approach LOS | | D | | | C | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 24.9 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.66 | | |
| Actuated Cycle Length (s) | 87.5 | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | 59.4% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2: Phillips Ln & Davis St

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|-------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 148 | 1170 | 21 | 19 | 628 | 420 | 54 | 13 | 274 | 477 | 3 | 134 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.86 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3170 | | 1620 | 3008 | 1328 | 1678 | 1442 | | 3143 | 1416 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.23 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3170 | | 1620 | 3008 | 1328 | 411 | 1442 | | 3143 | 1416 | |
| 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) | 161 | 1272 | 23 | 21 | 683 | 457 | 59 | 14 | 298 | 518 | 3 | 146 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 11 | 149 | 0 | 181 | 0 | 0 | 109 | 0 |
| Lane Group Flow (vph) | 161 | 1294 | 0 | 21 | 782 | 198 | 59 | 131 | 0 | 518 | 40 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 15.0 | 44.1 | | 4.4 | 33.5 | 59.8 | 17.2 | 17.2 | | 26.3 | 26.3 | |
| Effective Green, g (s) | 15.0 | 44.1 | | 4.4 | 33.5 | 59.8 | 17.2 | 17.2 | | 26.3 | 26.3 | |
| Actuated g/C Ratio | 0.14 | 0.42 | | 0.04 | 0.32 | 0.57 | 0.16 | 0.16 | | 0.25 | 0.25 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 231 | 1331 | | 67 | 959 | 756 | 67 | 236 | | 787 | 354 | |
| v/s Ratio Prot | c0.10 | c0.41 | | 0.01 | 0.26 | 0.07 | | 0.09 | | c0.16 | | |
| v/s Ratio Perm | | | | | | 0.08 | c0.14 | | | | | 0.03 |
| v/c Ratio | 0.70 | 0.97 | | 0.31 | 0.82 | 0.26 | 0.88 | 0.55 | | 0.66 | 0.11 | |
| Uniform Delay, d1 | 42.8 | 29.8 | | 48.8 | 32.9 | 11.4 | 42.9 | 40.4 | | 35.3 | 30.3 | |
| Progression Factor | 1.00 | 1.00 | | 1.48 | 0.67 | 2.56 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.2 | 18.8 | | 0.9 | 7.0 | 0.2 | 68.4 | 1.6 | | 2.0 | 0.1 | |
| Delay (s) | 50.0 | 48.7 | | 73.1 | 29.1 | 29.4 | 111.3 | 42.0 | | 37.3 | 30.5 | |
| Level of Service | D | D | | E | C | C | F | D | | D | C | |
| Approach Delay (s) | | 48.8 | | | 30.0 | | | 53.0 | | | 35.8 | |
| Approach LOS | | D | | | C | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 40.9 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.85 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 89.3% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↖ | ↗↖↗ | | ↖↗ | ↗↖↗ | | | ↖ | ↗↖↗ | ↖ | ↗ | ↖ |
| Volume (vph) | 27 | 1585 | 267 | 378 | 903 | 97 | 156 | 23 | 437 | 64 | 23 | 26 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.91 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4471 | | 3143 | 4698 | | | 1809 | 2805 | 1562 | 1471 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.72 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4471 | | 3143 | 4698 | | | 1351 | 2805 | 1562 | 1471 | |
| 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) | 29 | 1723 | 290 | 411 | 982 | 105 | 170 | 25 | 475 | 70 | 25 | 28 |
| RTOR Reduction (vph) | 0 | 20 | 0 | 0 | 10 | 0 | 0 | 0 | 146 | 0 | 25 | 0 |
| Lane Group Flow (vph) | 29 | 1993 | 0 | 411 | 1077 | 0 | 0 | 195 | 329 | 70 | 28 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 6.8 | 46.8 | | 16.5 | 57.0 | | | 18.6 | 35.1 | 9.6 | 9.6 | |
| Effective Green, g (s) | 6.8 | 46.8 | | 16.5 | 57.0 | | | 18.6 | 35.1 | 9.6 | 9.6 | |
| Actuated g/C Ratio | 0.06 | 0.45 | | 0.16 | 0.54 | | | 0.18 | 0.33 | 0.09 | 0.09 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 104 | 1992 | | 493 | 2550 | | | 239 | 937 | 142 | 134 | |
| v/s Ratio Prot | 0.02 | c0.45 | | c0.13 | 0.23 | | | | 0.06 | c0.04 | 0.02 | |
| v/s Ratio Perm | | | | | | | | c0.14 | 0.06 | | | |
| v/c Ratio | 0.28 | 1.00 | | 0.83 | 0.42 | | | 0.82 | 0.35 | 0.49 | 0.21 | |
| Uniform Delay, d1 | 46.8 | 29.1 | | 42.9 | 14.2 | | | 41.6 | 26.4 | 45.4 | 44.2 | |
| Progression Factor | 0.89 | 1.08 | | 1.22 | 1.10 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.3 | 15.1 | | 8.0 | 0.4 | | | 18.0 | 0.1 | 1.0 | 0.3 | |
| Delay (s) | 42.1 | 46.7 | | 60.4 | 16.0 | | | 59.6 | 26.4 | 46.4 | 44.4 | |
| Level of Service | D | D | | E | B | | | E | C | D | D | |
| Approach Delay (s) | | 46.6 | | | 28.2 | | | 36.1 | | | 45.5 | |
| Approach LOS | | D | | | C | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 38.6 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.88 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 74.0% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: I-880 SB ramps & Davis St/Davis Street

2020 PM + Project



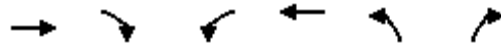
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|--------|------|------|------|------|------|------|-------|------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 1237 | 801 | 0 | 976 | 424 | 0 | 0 | 0 | 349 | 0 | 441 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.95 | | | | | 1.00 | 0.89 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.99 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3090 | | | | | 1681 | 1463 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.99 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3090 | | | | | 1681 | 1463 | 1461 |
| 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 | 1345 | 871 | 0 | 1061 | 461 | 0 | 0 | 0 | 379 | 0 | 479 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 38 | 38 |
| Lane Group Flow (vph) | 0 | 1345 | 871 | 0 | 1484 | 0 | 0 | 0 | 0 | 296 | 246 | 240 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 60.4 | 105.0 | | 60.4 | | | | | 36.6 | 36.6 | 36.6 |
| Effective Green, g (s) | | 60.4 | 105.0 | | 60.4 | | | | | 36.6 | 36.6 | 36.6 |
| Actuated g/C Ratio | | 0.58 | 1.00 | | 0.58 | | | | | 0.35 | 0.35 | 0.35 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1893 | 1439 | | 1777 | | | | | 585 | 509 | 509 |
| v/s Ratio Prot | | 0.41 | | | 0.48 | | | | | 0.18 | 0.17 | 0.16 |
| v/s Ratio Perm | | | 0.61 | | | | | | | | | |
| v/c Ratio | | 0.71 | 0.61 | | 0.83 | | | | | 0.51 | 0.48 | 0.47 |
| Uniform Delay, d1 | | 16.0 | 0.0 | | 18.2 | | | | | 27.0 | 26.8 | 26.7 |
| Progression Factor | | 0.61 | 1.00 | | 0.71 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 1.1 | 0.4 | | 4.4 | | | | | 0.7 | 0.7 | 0.7 |
| Delay (s) | | 11.0 | 0.4 | | 17.3 | | | | | 27.7 | 27.5 | 27.3 |
| Level of Service | | B | A | | B | | | | | C | C | C |
| Approach Delay (s) | | 6.8 | | | 17.3 | | | 0.0 | | | 27.5 | |
| Approach LOS | | A | | | B | | | A | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.1 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.77 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 70.9% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
5: I-880 NB Ramps & Davis Street

2020 PM + Project























| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↘↘ | ↗ |
| Volume (vph) | 1082 | 631 | 0 | 932 | 415 | 561 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Frt | 0.94 | | | 1.00 | 0.94 | 0.85 |
| Flt Protected | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3344 | | | 3539 | 3306 | 1441 |
| Flt Permitted | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3344 | | | 3539 | 3306 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1176 | 686 | 0 | 1013 | 451 | 610 |
| RTOR Reduction (vph) | 57 | 0 | 0 | 0 | 42 | 42 |
| Lane Group Flow (vph) | 1805 | 0 | 0 | 1013 | 684 | 293 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 70.1 | | | 70.1 | 27.9 | 27.9 |
| Effective Green, g (s) | 70.1 | | | 70.1 | 27.9 | 27.9 |
| Actuated g/C Ratio | 0.67 | | | 0.67 | 0.27 | 0.27 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2232 | | | 2362 | 878 | 382 |
| v/s Ratio Prot | c0.54 | | | 0.29 | c0.21 | 0.20 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.81 | | | 0.43 | 0.78 | 0.77 |
| Uniform Delay, d1 | 12.6 | | | 8.1 | 35.7 | 35.6 |
| Progression Factor | 0.44 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.7 | | | 0.6 | 4.0 | 8.1 |
| Delay (s) | 8.2 | | | 8.7 | 39.7 | 43.6 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 8.2 | | | 8.7 | 41.0 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 17.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.80 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 79.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
6: Doolittle Dr & Williams St

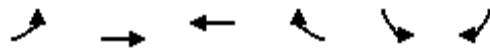
2020 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  | | |
| Volume (vph) | 52 | 82 | 22 | 100 | 72 | 83 | 16 | 641 | 71 | 166 | 906 | 52 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.99 | | |
| Flt Protected | | 0.98 | | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1525 | | | 1682 | 1302 | 1620 | 3025 | | 1562 | 3047 | | |
| Flt Permitted | | 0.84 | | | 0.71 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1297 | | | 1228 | 1302 | 1620 | 3025 | | 1562 | 3047 | | |
| 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) | 57 | 89 | 24 | 109 | 78 | 90 | 17 | 697 | 77 | 180 | 985 | 57 | |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 69 | 0 | 10 | 0 | 0 | 4 | 0 | |
| Lane Group Flow (vph) | 0 | 163 | 0 | 0 | 187 | 21 | 17 | 764 | 0 | 180 | 1038 | 0 | |
| Confl. Peds. (#/hr) | 14 | | | | | | 14 | 5 | | 2 | 2 | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 16.4 | | | 16.4 | 16.4 | 1.4 | 27.1 | | 14.0 | 39.2 | | |
| Effective Green, g (s) | | 16.4 | | | 16.4 | 16.4 | 1.4 | 27.1 | | 14.0 | 39.2 | | |
| Actuated g/C Ratio | | 0.23 | | | 0.23 | 0.23 | 0.02 | 0.38 | | 0.20 | 0.55 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 300 | | | 284 | 302 | 32 | 1159 | | 309 | 1689 | | |
| v/s Ratio Prot | | | | | | | 0.01 | 0.25 | | c0.12 | c0.34 | | |
| v/s Ratio Perm | | 0.13 | | | c0.15 | 0.02 | | | | | | | |
| v/c Ratio | | 0.54 | | | 0.66 | 0.07 | 0.53 | 0.66 | | 0.58 | 0.61 | | |
| Uniform Delay, d1 | | 23.9 | | | 24.6 | 21.2 | 34.3 | 18.0 | | 25.7 | 10.6 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 2.5 | | | 6.0 | 0.1 | 19.9 | 1.5 | | 3.3 | 0.8 | | |
| Delay (s) | | 26.4 | | | 30.6 | 21.3 | 54.2 | 19.5 | | 29.0 | 11.4 | | |
| Level of Service | | C | | | C | C | D | B | | C | B | | |
| Approach Delay (s) | | 26.4 | | | 27.6 | | | 20.3 | | | 14.0 | | |
| Approach LOS | | C | | | C | | | C | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 18.4 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.65 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 70.7 | | | | | | | | | Sum of lost time (s) | 13.7 |
| Intersection Capacity Utilization | | | 59.0% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

2020 PM + Project



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 51 | 422 | 226 | 280 | 350 | 55 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1555 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1555 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 55 | 459 | 246 | 304 | 380 | 60 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 154 | 0 | 23 |
| Lane Group Flow (vph) | 55 | 459 | 246 | 150 | 380 | 37 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 7.2 | 65.6 | 54.4 | 54.4 | 35.8 | 35.8 |
| Effective Green, g (s) | 7.2 | 65.6 | 54.4 | 54.4 | 35.8 | 35.8 |
| Actuated g/C Ratio | 0.07 | 0.60 | 0.49 | 0.49 | 0.33 | 0.33 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 106 | 1089 | 843 | 769 | 508 | 439 |
| v/s Ratio Prot | c0.03 | c0.25 | 0.14 | | c0.24 | |
| v/s Ratio Perm | | | | 0.10 | | 0.03 |
| v/c Ratio | 0.52 | 0.42 | 0.29 | 0.20 | 0.75 | 0.08 |
| Uniform Delay, d1 | 49.7 | 12.0 | 16.4 | 15.6 | 33.1 | 25.7 |
| Progression Factor | 1.00 | 1.00 | 1.26 | 2.91 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.8 | 1.2 | 0.8 | 0.5 | 6.0 | 0.1 |
| Delay (s) | 51.5 | 13.2 | 21.5 | 45.7 | 39.0 | 25.8 |
| Level of Service | D | B | C | D | D | C |
| Approach Delay (s) | | 17.3 | 34.9 | | 37.2 | |
| Approach LOS | | B | C | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 29.6 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.56 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 51.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis 2020 PM + Project
8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBL | EBT | EBR | WBL | WBT | NBL2 | NBL | NBR | SBL | SBT | SEL | SER |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|
| Lane Configurations | | ↑ | ↗ | ↖ | ↗ | | ↘ | ↗ | | ↕ | ↘ | ↘ |
| Volume (vph) | 2 | 290 | 478 | 135 | 208 | 234 | 8 | 156 | 1 | 8 | 1 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 9 | 10 | 11 | 11 | 16 | 12 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.97 | | 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 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.85 | | 1.00 | 0.88 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | 1759 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | 1757 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| 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) | 2 | 315 | 520 | 147 | 226 | 254 | 9 | 170 | 1 | 9 | 1 | 9 |
| RTOR Reduction (vph) | 0 | 0 | 288 | 0 | 0 | 0 | 0 | 109 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 317 | 232 | 147 | 226 | 0 | 263 | 61 | 0 | 10 | 10 | 0 |
| Confl. Peds. (#/hr) | | | 14 | | | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | 7 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Turn Type | Perm | NA | Perm | Prot | NA | Prot | Prot | Perm | Split | NA | Prot | |
| Protected Phases | | 2 | | 1 | 6 | 4 | 4 | | 8 | 8 | 7 | |
| Permitted Phases | 2 | | 2 | | | | | 4 | | | | |
| Actuated Green, G (s) | | 49.1 | 49.1 | 15.2 | 68.3 | | 21.3 | 21.3 | | 1.4 | 2.4 | |
| Effective Green, g (s) | | 49.1 | 49.1 | 15.2 | 68.3 | | 21.3 | 21.3 | | 1.4 | 2.4 | |
| Actuated g/C Ratio | | 0.45 | 0.45 | 0.14 | 0.62 | | 0.19 | 0.19 | | 0.01 | 0.02 | |
| Clearance Time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 784 | 643 | 215 | 1058 | | 324 | 330 | | 23 | 34 | |
| v/s Ratio Prot | | | | c0.09 | 0.13 | | c0.16 | | | c0.01 | c0.01 | |
| v/s Ratio Perm | | c0.18 | 0.16 | | | | | 0.04 | | | | |
| v/c Ratio | | 0.40 | 0.36 | 0.68 | 0.21 | | 0.81 | 0.19 | | 0.43 | 0.29 | |
| Uniform Delay, d1 | | 20.6 | 20.1 | 45.1 | 9.1 | | 42.4 | 37.1 | | 53.9 | 53.0 | |
| Progression Factor | | 0.72 | 1.09 | 1.00 | 1.00 | | 0.80 | 0.39 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.3 | 1.3 | 8.7 | 0.5 | | 13.9 | 0.3 | | 12.6 | 4.8 | |
| Delay (s) | | 16.2 | 23.2 | 53.8 | 9.6 | | 47.6 | 14.9 | | 66.5 | 57.7 | |
| Level of Service | | B | C | D | A | | D | B | | E | E | |
| Approach Delay (s) | | 20.6 | | | 27.0 | | | | | 66.5 | 57.7 | |
| Approach LOS | | C | | | C | | | | | E | E | |













| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 26.2 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.54 | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) 20.6 |
| Intersection Capacity Utilization | 78.7% | ICU Level of Service D |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

















9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

2020 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | ↑ | | | ↑ | ↗ | | | ↗ | ↗ | | |
| Volume (veh/h) | 0 | 627 | 5 | 0 | 497 | 13 | 0 | 0 | 15 | 21 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 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 |
| Hourly flow rate (vph) | 0 | 682 | 5 | 0 | 540 | 14 | 0 | 0 | 16 | 23 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 554 | | | 687 | | | 1224 | 1239 | 684 | 1241 | 1227 | 540 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 554 | | | 687 | | | 1224 | 1239 | 684 | 1241 | 1227 | 540 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 96 | 84 | 100 | 100 |
| cM capacity (veh/h) | 1016 | | | 907 | | | 156 | 175 | 449 | 146 | 178 | 542 |
| Direction, Lane # | EB 1 | WB 1 | WB 2 | NB 1 | SB 1 | | | | | | | |
| Volume Total | 687 | 540 | 14 | 16 | 23 | | | | | | | |
| Volume Left | 0 | 0 | 0 | 0 | 23 | | | | | | | |
| Volume Right | 5 | 0 | 14 | 16 | 0 | | | | | | | |
| cSH | 1700 | 1700 | 1700 | 449 | 146 | | | | | | | |
| Volume to Capacity | 0.40 | 0.32 | 0.01 | 0.04 | 0.16 | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | 3 | 13 | | | | | | | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 13.3 | 34.1 | | | | | | | |
| Lane LOS | | | | B | D | | | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 13.3 | 34.1 | | | | | | | |
| Approach LOS | | | | B | D | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.8 | | | | | | | | | |
| Intersection Capacity Utilization | | | 50.0% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2020 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 44 | 599 | 18 | 44 | 439 | 50 | 17 | 43 | 33 | 29 | 40 | 34 |
| 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 |
| Hourly flow rate (vph) | 48 | 651 | 20 | 48 | 477 | 54 | 18 | 47 | 36 | 32 | 43 | 37 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 718 | 579 | 101 | 112 | | | | | | | | |
| Volume Left (vph) | 48 | 48 | 18 | 32 | | | | | | | | |
| Volume Right (vph) | 20 | 54 | 36 | 37 | | | | | | | | |
| Hadj (s) | 0.03 | -0.01 | -0.14 | -0.11 | | | | | | | | |
| Departure Headway (s) | 5.7 | 5.7 | 7.3 | 7.3 | | | | | | | | |
| Degree Utilization, x | 1.0 | 0.91 | 0.20 | 0.23 | | | | | | | | |
| Capacity (veh/h) | 625 | 627 | 470 | 468 | | | | | | | | |
| Control Delay (s) | 101.8 | 41.5 | 12.2 | 12.4 | | | | | | | | |
| Approach Delay (s) | 101.8 | 41.5 | 12.2 | 12.4 | | | | | | | | |
| Approach LOS | F | E | B | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 66.1 | | | | | | | | | |
| Level of Service | | | F | | | | | | | | | |
| Intersection Capacity Utilization | | | 59.5% | ICU Level of Service | B | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2020 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 196 | 464 | 37 | 223 | 375 | 205 | 27 | 345 | 187 | 279 | 695 | 180 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1449 | 1620 | 1739 | 1393 | 1652 | 3240 | 1332 | 1620 | 2977 | 2977 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1449 | 1620 | 1739 | 1393 | 1652 | 3240 | 1332 | 1620 | 2977 | 2977 | |
| 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) | 213 | 504 | 40 | 242 | 408 | 223 | 29 | 375 | 203 | 303 | 755 | 196 | |
| RTOR Reduction (vph) | 0 | 0 | 31 | 0 | 0 | 148 | 0 | 0 | 151 | 0 | 15 | 0 | |
| Lane Group Flow (vph) | 213 | 504 | 9 | 242 | 408 | 75 | 29 | 375 | 52 | 303 | 936 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 19.9 | 24.3 | 24.3 | 21.8 | 26.2 | 26.2 | 5.3 | 21.9 | 21.9 | 26.4 | 43.0 | | |
| Effective Green, g (s) | 19.9 | 24.3 | 24.3 | 21.8 | 26.2 | 26.2 | 5.3 | 21.9 | 21.9 | 26.4 | 43.0 | | |
| Actuated g/C Ratio | 0.18 | 0.22 | 0.22 | 0.19 | 0.23 | 0.23 | 0.05 | 0.19 | 0.19 | 0.23 | 0.38 | | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 292 | 375 | 313 | 314 | 405 | 324 | 77 | 631 | 259 | 380 | 1138 | | |
| v/s Ratio Prot | 0.13 | c0.29 | | c0.15 | 0.23 | | 0.02 | 0.12 | | c0.19 | c0.31 | | |
| v/s Ratio Perm | | | 0.01 | | | 0.05 | | | 0.04 | | | | |
| v/c Ratio | 0.73 | 1.34 | 0.03 | 0.77 | 1.01 | 0.23 | 0.38 | 0.59 | 0.20 | 0.80 | 0.82 | | |
| Uniform Delay, d1 | 43.7 | 44.1 | 34.7 | 42.9 | 43.1 | 34.9 | 51.9 | 41.2 | 37.9 | 40.5 | 31.3 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 9.4 | 171.7 | 0.0 | 11.7 | 46.6 | 0.5 | 4.2 | 1.8 | 0.5 | 11.7 | 5.1 | | |
| Delay (s) | 53.1 | 215.8 | 34.8 | 54.7 | 89.7 | 35.4 | 56.1 | 43.0 | 38.5 | 52.1 | 36.4 | | |
| Level of Service | D | F | C | D | F | D | E | D | D | D | D | | |
| Approach Delay (s) | | 160.4 | | | 66.1 | | | 42.1 | | | 40.2 | | |
| Approach LOS | | F | | | E | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 73.1 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 0.96 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 112.4 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 80.3% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Merced St & Marina Blvd

2020 PM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 58 | 982 | 76 | 788 | 748 | 134 | 81 | 237 | 974 | 323 | 315 | 42 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4605 | | 3255 | 3158 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4605 | | 3255 | 3158 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| 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) | 63 | 1067 | 83 | 857 | 813 | 146 | 88 | 258 | 1059 | 351 | 342 | 46 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| Lane Group Flow (vph) | 63 | 1142 | 0 | 857 | 946 | 0 | 88 | 258 | 1059 | 351 | 342 | 11 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 9.0 | 28.0 | | 27.0 | 46.0 | | 12.0 | 25.0 | 56.0 | 11.0 | 24.0 | 24.0 |
| Effective Green, g (s) | 9.0 | 29.5 | | 27.0 | 47.5 | | 12.0 | 26.5 | 56.0 | 11.0 | 25.5 | 25.5 |
| Actuated g/C Ratio | 0.08 | 0.27 | | 0.25 | 0.43 | | 0.11 | 0.24 | 0.51 | 0.10 | 0.23 | 0.23 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 127 | 1234 | | 798 | 1363 | | 183 | 808 | 1377 | 325 | 751 | 341 |
| v/s Ratio Prot | 0.04 | c0.25 | | c0.26 | 0.30 | | 0.05 | 0.08 | c0.39 | c0.11 | 0.11 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 |
| v/c Ratio | 0.50 | 0.93 | | 1.07 | 0.69 | | 0.48 | 0.32 | 0.77 | 1.08 | 0.46 | 0.03 |
| Uniform Delay, d1 | 48.3 | 39.2 | | 41.5 | 25.4 | | 46.1 | 34.3 | 21.8 | 49.5 | 36.3 | 32.7 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.84 | 0.76 | 0.65 | 1.01 | 0.98 | 1.00 |
| Incremental Delay, d2 | 4.1 | 13.0 | | 53.6 | 2.9 | | 8.5 | 0.3 | 2.7 | 72.4 | 0.6 | 0.1 |
| Delay (s) | 52.4 | 52.2 | | 95.1 | 28.3 | | 47.0 | 26.5 | 16.9 | 122.3 | 36.2 | 32.7 |
| Level of Service | D | D | | F | C | | D | C | B | F | D | C |
| Approach Delay (s) | | 52.2 | | | 59.8 | | | 20.5 | | | 76.9 | |
| Approach LOS | | D | | | E | | | C | | | E | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 49.8 | | | | | | | | | D |
| HCM 2000 Volume to Capacity ratio | | | 0.96 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | 17.5 | | | |
| Intersection Capacity Utilization | | | 86.5% | | | | | | | | | E |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2020 PM + Project



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑↑↑ | | ↙ | ↑↑ | | ↗ |
| Volume (vph) | 2368 | 77 | 310 | 0 | 0 | 542 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 1.00 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6377 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6377 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 2574 | 84 | 337 | 0 | 0 | 589 |
| RTOR Reduction (vph) | 6 | 0 | 0 | 0 | 0 | 1 |
| Lane Group Flow (vph) | 2652 | 0 | 337 | 0 | 0 | 588 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 33.5 | | 26.6 | | | 26.6 |
| Effective Green, g (s) | 33.5 | | 26.6 | | | 26.6 |
| Actuated g/C Ratio | 0.48 | | 0.38 | | | 0.38 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 3069 | | 676 | | | 615 |
| v/s Ratio Prot | c0.42 | | 0.19 | | | c0.37 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.86 | | 0.50 | | | 0.96 |
| Uniform Delay, d1 | 16.0 | | 16.4 | | | 20.9 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 2.8 | | 0.6 | | | 25.7 |
| Delay (s) | 18.8 | | 17.0 | | | 46.6 |
| Level of Service | B | | B | | | D |
| Approach Delay (s) | 18.8 | | | 17.0 | 46.6 | |
| Approach LOS | B | | | B | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 23.2 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.90 | | |
| Actuated Cycle Length (s) | 69.6 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 77.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020 PM + Project

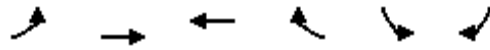


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|-------|------|------|------|------|------|-------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1800 | 899 | 408 | 956 | 0 | 0 | 0 | 547 | 0 | 0 | 1039 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1957 | 977 | 443 | 1039 | 0 | 0 | 0 | 595 | 0 | 0 | 1129 | |
| RTOR Reduction (vph) | 0 | 0 | 251 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 202 | |
| Lane Group Flow (vph) | 0 | 1957 | 726 | 443 | 1039 | 0 | 0 | 0 | 595 | 0 | 0 | 927 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 79.5 | 79.5 | 18.5 | 105.0 | | | | 38.5 | | | 38.5 | |
| Effective Green, g (s) | | 79.5 | 79.5 | 18.5 | 105.0 | | | | 38.5 | | | 38.5 | |
| Actuated g/C Ratio | | 0.53 | 0.53 | 0.12 | 0.70 | | | | 0.26 | | | 0.26 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1778 | 1400 | 387 | 2348 | | | | 748 | | | 715 | |
| v/s Ratio Prot | | c0.58 | | c0.14 | 0.31 | | | | 0.20 | | | c0.33 | |
| v/s Ratio Perm | | | 0.27 | | | | | | | | | | |
| v/c Ratio | | 1.10 | 0.52 | 1.14 | 0.44 | | | | 0.80 | | | 1.30 | |
| Uniform Delay, d1 | | 35.2 | 22.9 | 65.8 | 9.8 | | | | 52.1 | | | 55.8 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 54.5 | 0.3 | 91.3 | 0.1 | | | | 5.9 | | | 143.5 | |
| Delay (s) | | 89.8 | 23.2 | 157.1 | 9.9 | | | | 57.9 | | | 199.3 | |
| Level of Service | | F | C | F | A | | | | E | | | F | |
| Approach Delay (s) | | 67.6 | | | 53.9 | | | 57.9 | | | 199.3 | | |
| Approach LOS | | E | | | D | | | E | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 87.6 | | | | | | | | | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | | | 1.16 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 150.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 76.4% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps

2020 PM + Project



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↵ | ↑↑↑ | ↑↑ | ↵ | | |
| Volume (vph) | 675 | 0 | 787 | 502 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 734 | 0 | 855 | 546 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 98 | 0 | 0 |
| Lane Group Flow (vph) | 734 | 0 | 855 | 448 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 31.8 | | 23.5 | 23.5 | | |
| Effective Green, g (s) | 31.8 | | 23.5 | 23.5 | | |
| Actuated g/C Ratio | 0.49 | | 0.37 | 0.37 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 801 | | 1226 | 559 | | |
| v/s Ratio Prot | c0.45 | | 0.25 | | | |
| v/s Ratio Perm | | | | c0.29 | | |
| v/c Ratio | 0.92 | | 0.70 | 0.80 | | |
| Uniform Delay, d1 | 15.0 | | 17.4 | 18.3 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 15.1 | | 1.8 | 8.1 | | |
| Delay (s) | 30.1 | | 19.1 | 26.4 | | |
| Level of Service | C | | B | C | | |
| Approach Delay (s) | | 30.1 | 22.0 | | 0.0 | |
| Approach LOS | | C | C | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 24.8 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.87 | | |
| Actuated Cycle Length (s) | 64.3 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 76.0% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd
























2020 PM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|-------|------|------|-------|-------|------|-------|-------|-----------------------------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 238 | 1481 | 283 | 151 | 690 | 19 | 365 | 23 | 108 | 16 | 48 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4633 | | 1539 | 1551 | 1514 | | 1745 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4633 | | 1539 | 1551 | 1514 | | 1745 | 1489 |
| 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) | 259 | 1610 | 308 | 164 | 750 | 21 | 397 | 25 | 117 | 17 | 52 | 64 |
| RTOR Reduction (vph) | 0 | 0 | 169 | 0 | 3 | 0 | 0 | 0 | 93 | 0 | 0 | 61 |
| Lane Group Flow (vph) | 259 | 1610 | 139 | 164 | 768 | 0 | 210 | 212 | 24 | 0 | 69 | 3 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 20.6 | 45.1 | 45.1 | 10.0 | 34.5 | | 20.9 | 20.9 | 20.9 | | 4.8 | 4.8 |
| Effective Green, g (s) | 20.6 | 45.1 | 45.1 | 10.0 | 34.5 | | 20.9 | 20.9 | 20.9 | | 4.8 | 4.8 |
| Actuated g/C Ratio | 0.21 | 0.45 | 0.45 | 0.10 | 0.34 | | 0.21 | 0.21 | 0.21 | | 0.05 | 0.05 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 333 | 2099 | 690 | 167 | 1598 | | 321 | 324 | 316 | | 83 | 71 |
| v/s Ratio Prot | 0.16 | c0.35 | | c0.10 | 0.17 | | 0.14 | c0.14 | | | c0.04 | 0.00 |
| v/s Ratio Perm | | | 0.09 | | | | | | 0.02 | | | |
| v/c Ratio | 0.78 | 0.77 | 0.20 | 0.98 | 0.48 | | 0.65 | 0.65 | 0.08 | | 0.83 | 0.04 |
| Uniform Delay, d1 | 37.5 | 23.0 | 16.6 | 44.9 | 25.7 | | 36.2 | 36.2 | 31.8 | | 47.2 | 45.4 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.85 | 0.83 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 11.5 | 2.8 | 0.7 | 63.1 | 1.0 | | 5.2 | 5.2 | 0.1 | | 49.4 | 0.3 |
| Delay (s) | 49.0 | 25.8 | 17.2 | 101.2 | 22.2 | | 41.5 | 41.4 | 31.9 | | 96.6 | 45.8 |
| Level of Service | D | C | B | F | C | | D | D | C | | F | D |
| Approach Delay (s) | | 27.3 | | | 36.1 | | | 39.4 | | | 72.1 | |
| Approach LOS | | C | | | D | | | D | | | E | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 32.8 | | | | | | | | | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | | | 0.77 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | | | | | | | | Sum of lost time (s) 19.2 |
| Intersection Capacity Utilization | | | 67.1% | | | | | | | | | ICU Level of Service C |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 17: Alvarado St & Marina Blvd

2020 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  | |  |  |  |  |  |  |
| Volume (vph) | 62 | 1379 | 143 | 179 | 508 | 19 | 154 | 125 | 564 | 34 | 117 | 74 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3269 | | 3143 | 3240 | 1660 | 3204 | 3026 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3269 | | 3143 | 3240 | 1660 | 3204 | 3026 | |
| 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) | 67 | 1499 | 155 | 195 | 552 | 21 | 167 | 136 | 613 | 37 | 127 | 80 |
| RTOR Reduction (vph) | 0 | 0 | 89 | 0 | 3 | 0 | 0 | 0 | 161 | 0 | 70 | 0 |
| Lane Group Flow (vph) | 67 | 1499 | 66 | 195 | 570 | 0 | 167 | 136 | 452 | 37 | 137 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 7.1 | 42.4 | 42.4 | 11.0 | 46.3 | | 17.0 | 26.2 | 26.2 | 2.4 | 12.0 | |
| Effective Green, g (s) | 7.1 | 42.4 | 42.4 | 11.0 | 46.3 | | 17.0 | 26.2 | 26.2 | 2.4 | 12.0 | |
| Actuated g/C Ratio | 0.07 | 0.42 | 0.42 | 0.11 | 0.46 | | 0.17 | 0.26 | 0.26 | 0.02 | 0.12 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 115 | 1400 | 636 | 181 | 1513 | | 534 | 848 | 434 | 76 | 363 | |
| v/s Ratio Prot | 0.04 | c0.45 | | c0.12 | c0.17 | | 0.05 | 0.04 | | 0.01 | c0.05 | |
| v/s Ratio Perm | | | 0.04 | | | | | | c0.27 | | | |
| v/c Ratio | 0.58 | 1.07 | 0.10 | 1.08 | 0.38 | | 0.31 | 0.16 | 1.04 | 0.49 | 0.38 | |
| Uniform Delay, d1 | 45.0 | 28.8 | 17.3 | 44.5 | 17.5 | | 36.4 | 28.4 | 36.9 | 48.2 | 40.6 | |
| Progression Factor | 1.42 | 0.40 | 0.11 | 1.11 | 0.41 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.3 | 41.9 | 0.2 | 44.5 | 0.1 | | 0.5 | 0.1 | 54.5 | 6.6 | 0.9 | |
| Delay (s) | 67.2 | 53.5 | 2.1 | 93.8 | 7.2 | | 36.8 | 28.5 | 91.4 | 54.7 | 41.4 | |
| Level of Service | E | D | A | F | A | | D | C | F | D | D | |
| Approach Delay (s) | | 49.4 | | | 29.2 | | | 72.1 | | | 43.5 | |
| Approach LOS | | D | | | C | | | E | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 50.4 | | | | HCM 2000 Level of Service | | | D | | |
| HCM 2000 Volume to Capacity ratio | | | 1.02 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | | | Sum of lost time (s) | | | 18.0 | | |
| Intersection Capacity Utilization | | | 88.3% | | | | ICU Level of Service | | | E | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|-------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 820 | 621 | 536 | 4 | 223 | 38 | 225 | 746 | 14 | 65 | 933 | 278 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1737 | 1477 | 1652 | 3528 | | 1652 | 3176 | |
| Flt Permitted | 0.27 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 470 | 1739 | 1770 | | 1718 | 1477 | 1652 | 3528 | | 1652 | 3176 | |
| 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) | 891 | 675 | 583 | 4 | 242 | 41 | 245 | 811 | 15 | 71 | 1014 | 302 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 1 | 0 | 0 | 27 | 0 |
| Lane Group Flow (vph) | 891 | 675 | 583 | 0 | 246 | 8 | 245 | 825 | 0 | 71 | 1289 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 42.6 | 42.6 | 100.0 | | 19.1 | 19.1 | 17.3 | 35.2 | | 7.7 | 25.1 | |
| Effective Green, g (s) | 42.6 | 42.6 | 100.0 | | 19.1 | 19.1 | 17.3 | 35.2 | | 7.7 | 25.1 | |
| Actuated g/C Ratio | 0.43 | 0.43 | 1.00 | | 0.19 | 0.19 | 0.17 | 0.35 | | 0.08 | 0.25 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 430 | 740 | 1770 | | 328 | 282 | 285 | 1241 | | 127 | 797 | |
| v/s Ratio Prot | c0.40 | 0.39 | | | | | c0.15 | 0.23 | | 0.04 | c0.41 | |
| v/s Ratio Perm | c0.48 | | 0.33 | | 0.14 | 0.01 | | | | | | |
| v/c Ratio | 2.07 | 0.91 | 0.33 | | 0.75 | 0.03 | 0.86 | 0.66 | | 0.56 | 1.62 | |
| Uniform Delay, d1 | 24.1 | 26.9 | 0.0 | | 38.2 | 32.9 | 40.2 | 27.4 | | 44.5 | 37.5 | |
| Progression Factor | 0.94 | 0.56 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 483.2 | 1.9 | 0.0 | | 9.8 | 0.1 | 21.8 | 2.8 | | 5.3 | 283.6 | |
| Delay (s) | 505.8 | 16.9 | 0.0 | | 48.0 | 33.0 | 62.0 | 30.2 | | 49.8 | 321.1 | |
| Level of Service | F | B | A | | D | C | E | C | | D | F | |
| Approach Delay (s) | | 215.0 | | | 45.9 | | | 37.5 | | | 307.2 | |
| Approach LOS | | F | | | D | | | D | | | F | |

| Intersection Summary | | |
|-----------------------------------|--------|---------------------------|
| HCM 2000 Control Delay | 192.4 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 1.74 | F |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 123.9% | 19.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | H |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

2020 PM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 476 | 139 | 100 | 91 | 165 | 217 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 517 | 151 | 109 | 99 | 179 | 236 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 668 | 208 | 415 | | | |
| Volume Left (vph) | 517 | 109 | 0 | | | |
| Volume Right (vph) | 151 | 0 | 236 | | | |
| Hadj (s) | 0.05 | 0.14 | -0.31 | | | |
| Departure Headway (s) | 5.8 | 6.7 | 5.9 | | | |
| Degree Utilization, x | 1.0 | 0.39 | 0.69 | | | |
| Capacity (veh/h) | 609 | 522 | 598 | | | |
| Control Delay (s) | 85.0 | 14.0 | 20.9 | | | |
| Approach Delay (s) | 85.0 | 14.0 | 20.9 | | | |
| Approach LOS | F | B | C | | | |
| Intersection Summary | | | | | | |
| Delay | | | 52.9 | | | |
| Level of Service | | | F | | | |
| Intersection Capacity Utilization | | | 77.2% | ICU Level of Service | D | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

2020 PM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 16 | 15 | 26 | 174 | 220 | 35 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 16 | 28 | 189 | 239 | 38 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 34 | 217 | 277 | | | |
| Volume Left (vph) | 17 | 28 | 0 | | | |
| Volume Right (vph) | 16 | 0 | 38 | | | |
| Hadj (s) | -0.15 | 0.06 | -0.05 | | | |
| Departure Headway (s) | 4.8 | 4.3 | 4.2 | | | |
| Degree Utilization, x | 0.04 | 0.26 | 0.32 | | | |
| Capacity (veh/h) | 674 | 813 | 842 | | | |
| Control Delay (s) | 8.0 | 8.8 | 9.1 | | | |
| Approach Delay (s) | 8.0 | 8.8 | 9.1 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.9 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 37.6% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Signalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive

2020 PM + Project



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Volume (vph) | 39 | 129 | 71 | 63 | 150 | 81 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Util. Factor | 1.00 | | 1.00 | | | 1.00 |
| Frt | 0.90 | | 0.94 | | | 1.00 |
| Flt Protected | 0.99 | | 1.00 | | | 0.97 |
| Satd. Flow (prot) | 1650 | | 1745 | | | 1804 |
| Flt Permitted | 0.99 | | 1.00 | | | 0.72 |
| Satd. Flow (perm) | 1650 | | 1745 | | | 1343 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 42 | 140 | 77 | 68 | 163 | 88 |
| RTOR Reduction (vph) | 84 | 0 | 41 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 98 | 0 | 104 | 0 | 0 | 251 |
| Turn Type | Prot | | NA | | Perm | NA |
| Protected Phases | 8 | | 2 | | | 6 |
| Permitted Phases | | | | | 6 | |
| Actuated Green, G (s) | 18.0 | | 18.0 | | | 18.0 |
| Effective Green, g (s) | 18.0 | | 18.0 | | | 18.0 |
| Actuated g/C Ratio | 0.40 | | 0.40 | | | 0.40 |
| Clearance Time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Grp Cap (vph) | 660 | | 698 | | | 537 |
| v/s Ratio Prot | c0.06 | | 0.06 | | | |
| v/s Ratio Perm | | | | | | c0.19 |
| v/c Ratio | 0.15 | | 0.15 | | | 0.47 |
| Uniform Delay, d1 | 8.6 | | 8.6 | | | 10.0 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.5 | | 0.5 | | | 2.9 |
| Delay (s) | 9.1 | | 9.1 | | | 12.9 |
| Level of Service | A | | A | | | B |
| Approach Delay (s) | 9.1 | | 9.1 | | | 12.9 |
| Approach LOS | A | | A | | | B |


















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 10.7 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.31 | | |
| Actuated Cycle Length (s) | 45.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 41.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2020 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 10 | 241 | 20 | 31 | 249 | 42 | 17 | 21 | 22 | 36 | 24 | 25 |
| 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 |
| Hourly flow rate (vph) | 11 | 262 | 22 | 34 | 271 | 46 | 18 | 23 | 24 | 39 | 26 | 27 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 11 | 284 | 350 | 65 | 92 | | | | | | | |
| Volume Left (vph) | 11 | 0 | 34 | 18 | 39 | | | | | | | |
| Volume Right (vph) | 0 | 22 | 46 | 24 | 27 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | -0.03 | -0.13 | -0.06 | | | | | | | |
| Departure Headway (s) | 5.8 | 5.3 | 4.8 | 5.5 | 5.5 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.41 | 0.47 | 0.10 | 0.14 | | | | | | | |
| Capacity (veh/h) | 598 | 659 | 720 | 561 | 572 | | | | | | | |
| Control Delay (s) | 7.7 | 10.7 | 12.0 | 9.1 | 9.4 | | | | | | | |
| Approach Delay (s) | 10.6 | | 12.0 | 9.1 | 9.4 | | | | | | | |
| Approach LOS | B | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 11.0 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 48.8% | | ICU Level of Service | | A | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
23: Doolittle Dr & Fairway Drive/Fairway Dr

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 46 | 168 | 123 | 122 | 150 | 184 | 90 | 340 | 156 | 189 | 591 | 79 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 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 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1717 | 1259 | 1620 | 1739 | 1316 | 1711 | 2911 | | 1620 | 3020 | |
| Flt Permitted | | 0.90 | 1.00 | 0.55 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1557 | 1259 | 933 | 1739 | 1316 | 1711 | 2911 | | 1620 | 3020 | |
| 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) | 50 | 183 | 134 | 133 | 163 | 200 | 98 | 370 | 170 | 205 | 642 | 86 |
| RTOR Reduction (vph) | 0 | 0 | 100 | 0 | 0 | 149 | 0 | 76 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 0 | 233 | 34 | 133 | 163 | 51 | 98 | 464 | 0 | 205 | 715 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 15.4 | 15.4 | 15.4 | 15.4 | 15.4 | 7.4 | 17.3 | | 12.5 | 22.4 | |
| Effective Green, g (s) | | 15.4 | 15.4 | 15.4 | 15.4 | 15.4 | 7.4 | 17.3 | | 12.5 | 22.4 | |
| Actuated g/C Ratio | | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.12 | 0.29 | | 0.21 | 0.37 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 398 | 322 | 238 | 444 | 336 | 210 | 836 | | 336 | 1123 | |
| v/s Ratio Prot | | | | | 0.09 | | 0.06 | 0.16 | | c0.13 | c0.24 | |
| v/s Ratio Perm | | c0.15 | 0.03 | 0.14 | | 0.04 | | | | | | |
| v/c Ratio | | 0.59 | 0.11 | 0.56 | 0.37 | 0.15 | 0.47 | 0.55 | | 0.61 | 0.64 | |
| Uniform Delay, d1 | | 19.6 | 17.1 | 19.5 | 18.4 | 17.3 | 24.6 | 18.2 | | 21.6 | 15.6 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 2.2 | 0.1 | 2.8 | 0.5 | 0.2 | 1.6 | 1.0 | | 3.3 | 1.3 | |
| Delay (s) | | 21.8 | 17.3 | 22.3 | 18.9 | 17.6 | 26.2 | 19.2 | | 24.9 | 16.9 | |
| Level of Service | | C | B | C | B | B | C | B | | C | B | |
| Approach Delay (s) | | 20.2 | | | 19.3 | | | 20.3 | | | 18.7 | |
| Approach LOS | | C | | | B | | | C | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.4 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 60.2 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 66.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

2020 PM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|------|-------|------|------|-------|------|------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 199 | 333 | 130 | 112 | 259 | 73 | 102 | 509 | 121 | 128 | 652 | 130 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3131 | | 1593 | 3144 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3131 | | 1593 | 3144 | |
| 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) | 216 | 362 | 141 | 122 | 282 | 79 | 111 | 553 | 132 | 139 | 709 | 141 |
| RTOR Reduction (vph) | 0 | 0 | 104 | 0 | 0 | 63 | 0 | 18 | 0 | 0 | 15 | 0 |
| Lane Group Flow (vph) | 216 | 362 | 37 | 122 | 282 | 16 | 111 | 667 | 0 | 139 | 835 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 18.8 | 29.1 | 29.1 | 12.3 | 22.6 | 22.6 | 12.7 | 36.6 | | 13.0 | 36.9 | |
| Effective Green, g (s) | 18.8 | 29.1 | 29.1 | 12.3 | 22.6 | 22.6 | 12.7 | 36.6 | | 13.0 | 36.9 | |
| Actuated g/C Ratio | 0.17 | 0.26 | 0.26 | 0.11 | 0.21 | 0.21 | 0.12 | 0.33 | | 0.12 | 0.34 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 269 | 488 | 345 | 178 | 382 | 277 | 190 | 1041 | | 188 | 1054 | |
| v/s Ratio Prot | 0.14 | c0.20 | | 0.08 | c0.15 | | 0.07 | c0.21 | | 0.09 | c0.27 | |
| v/s Ratio Perm | | | 0.03 | | | 0.01 | | | | | | |
| v/c Ratio | 0.80 | 0.74 | 0.11 | 0.69 | 0.74 | 0.06 | 0.58 | 0.64 | | 0.74 | 0.79 | |
| Uniform Delay, d1 | 43.8 | 37.0 | 30.6 | 47.0 | 40.9 | 35.1 | 46.1 | 31.1 | | 46.9 | 33.1 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.93 | | 1.01 | 0.41 | |
| Incremental Delay, d2 | 16.5 | 6.4 | 0.2 | 11.3 | 7.8 | 0.1 | 5.2 | 3.0 | | 14.1 | 5.7 | |
| Delay (s) | 60.4 | 43.4 | 30.8 | 58.3 | 48.7 | 35.3 | 49.0 | 32.0 | | 61.4 | 19.2 | |
| Level of Service | E | D | C | E | D | D | D | C | | E | B | |
| Approach Delay (s) | | 46.0 | | | 48.9 | | | 34.4 | | | 25.1 | |
| Approach LOS | | D | | | D | | | C | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 36.5 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.78 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 73.0% | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|--------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 39 | 492 | 3 | 6 | 327 | 75 | 10 | 0 | 7 | 219 | 0 | 72 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | | 1.00 |
| Frt | 1.00 | 1.00 | | | 0.97 | | | 0.94 | | 1.00 | | 0.85 |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.97 | | 0.95 | | 1.00 |
| Satd. Flow (prot) | 1770 | 1861 | | | 3438 | | | 1707 | | 1770 | | 1583 |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.97 | | 0.75 | | 1.00 |
| Satd. Flow (perm) | 1770 | 1861 | | | 3260 | | | 1707 | | 1388 | | 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) | 42 | 535 | 3 | 7 | 355 | 82 | 11 | 0 | 8 | 238 | 0 | 78 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 14 | 0 | 0 | 0 | 57 |
| Lane Group Flow (vph) | 42 | 538 | 0 | 0 | 412 | 0 | 0 | 5 | 0 | 238 | 0 | 21 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | |
| Permitted Phases | | | | | | | 8 | | | 4 | | 4 |
| Actuated Green, G (s) | 2.4 | 32.4 | | | 25.1 | | | 14.9 | | 14.9 | | 14.9 |
| Effective Green, g (s) | 2.4 | 32.4 | | | 25.1 | | | 14.9 | | 14.9 | | 14.9 |
| Actuated g/C Ratio | 0.04 | 0.58 | | | 0.45 | | | 0.27 | | 0.27 | | 0.27 |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Grp Cap (vph) | 75 | 1072 | | | 1455 | | | 452 | | 367 | | 419 |
| v/s Ratio Prot | 0.02 | c0.29 | | | | | | | | | | |
| v/s Ratio Perm | | | | | 0.13 | | | 0.00 | | c0.17 | | 0.01 |
| v/c Ratio | 0.56 | 0.50 | | | 1.44dr | | | 0.01 | | 0.65 | | 0.05 |
| Uniform Delay, d1 | 26.4 | 7.1 | | | 9.9 | | | 15.2 | | 18.3 | | 15.4 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | | 1.00 |
| Incremental Delay, d2 | 5.6 | 0.5 | | | 0.1 | | | 0.0 | | 4.4 | | 0.1 |
| Delay (s) | 32.0 | 7.6 | | | 10.0 | | | 15.2 | | 22.7 | | 15.4 |
| Level of Service | C | A | | | A | | | B | | C | | B |
| Approach Delay (s) | | 9.4 | | | 10.0 | | | 15.2 | | | 20.9 | |
| Approach LOS | | A | | | A | | | B | | | C | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 12.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.61 | | |
| Actuated Cycle Length (s) | 56.2 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 58.4% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
26: Miller St & Fairway Dr/Aladdin Ave

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 32 | 657 | 14 | 18 | 432 | 75 | 69 | 2 | 57 | 220 | 2 | 58 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1856 | | 1593 | 1943 | | 1711 | 1539 | | 1770 | 1592 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.71 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1856 | | 1593 | 1943 | | 1287 | 1539 | | 1770 | 1592 | |
| 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) | 35 | 714 | 15 | 20 | 470 | 82 | 75 | 2 | 62 | 239 | 2 | 63 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 55 | 0 | 0 | 42 | 0 |
| Lane Group Flow (vph) | 35 | 728 | 0 | 20 | 547 | 0 | 75 | 9 | 0 | 239 | 23 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 4.0 | 39.3 | | 2.4 | 37.7 | | 9.4 | 9.4 | | 14.5 | 27.9 | |
| Effective Green, g (s) | 4.0 | 39.3 | | 2.4 | 37.7 | | 9.4 | 9.4 | | 14.5 | 27.9 | |
| Actuated g/C Ratio | 0.05 | 0.47 | | 0.03 | 0.45 | | 0.11 | 0.11 | | 0.17 | 0.33 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 84 | 874 | | 45 | 878 | | 145 | 173 | | 307 | 532 | |
| v/s Ratio Prot | c0.02 | c0.39 | | 0.01 | 0.28 | | | 0.01 | | c0.14 | 0.01 | |
| v/s Ratio Perm | | | | | | | c0.06 | | | | | |
| v/c Ratio | 0.42 | 0.83 | | 0.44 | 0.62 | | 0.52 | 0.05 | | 0.78 | 0.04 | |
| Uniform Delay, d1 | 38.6 | 19.2 | | 39.8 | 17.4 | | 34.9 | 33.0 | | 32.9 | 18.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.2 | 7.2 | | 2.5 | 1.6 | | 4.1 | 0.2 | | 10.8 | 0.0 | |
| Delay (s) | 39.8 | 26.4 | | 42.4 | 19.0 | | 39.0 | 33.2 | | 43.7 | 18.8 | |
| Level of Service | D | C | | D | B | | D | C | | D | B | |
| Approach Delay (s) | | 27.0 | | | 19.8 | | | 36.3 | | | 38.4 | |
| Approach LOS | | C | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 27.4 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.77 | | |
| Actuated Cycle Length (s) | 83.4 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 61.7% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

27: Teagarden St & Aladdin Ave

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 100 | 785 | 155 | 2 | 294 | 64 | 48 | 101 | 11 | 36 | 204 | 122 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1974 | | 1711 | 1665 | | 1652 | 1831 | | 1644 | 1793 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.33 | 1.00 | | 0.68 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1974 | | 1711 | 1665 | | 580 | 1831 | | 1174 | 1793 | |
| 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) | 109 | 853 | 168 | 2 | 320 | 70 | 52 | 110 | 12 | 39 | 222 | 133 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 10 | 0 | 0 | 6 | 0 | 0 | 31 | 0 |
| Lane Group Flow (vph) | 109 | 1013 | 0 | 2 | 380 | 0 | 52 | 116 | 0 | 39 | 324 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 8.4 | 31.0 | | 1.1 | 23.7 | | 16.8 | 16.8 | | 16.8 | 16.8 | |
| Effective Green, g (s) | 8.4 | 31.0 | | 1.1 | 23.7 | | 16.8 | 16.8 | | 16.8 | 16.8 | |
| Actuated g/C Ratio | 0.14 | 0.50 | | 0.02 | 0.38 | | 0.27 | 0.27 | | 0.27 | 0.27 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 232 | 988 | | 30 | 637 | | 157 | 496 | | 318 | 486 | |
| v/s Ratio Prot | c0.06 | c0.51 | | 0.00 | 0.23 | | | 0.06 | | | c0.18 | |
| v/s Ratio Perm | | | | | | | 0.09 | | | 0.03 | | |
| v/c Ratio | 0.47 | 1.03 | | 0.07 | 0.60 | | 0.33 | 0.23 | | 0.12 | 0.67 | |
| Uniform Delay, d1 | 24.7 | 15.4 | | 29.9 | 15.3 | | 18.1 | 17.5 | | 17.0 | 20.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.0 | 35.2 | | 1.3 | 1.8 | | 1.7 | 0.3 | | 0.2 | 3.8 | |
| Delay (s) | 26.7 | 50.7 | | 31.2 | 17.0 | | 19.7 | 17.9 | | 17.2 | 23.8 | |
| Level of Service | C | D | | C | B | | B | B | | B | C | |
| Approach Delay (s) | | 48.4 | | | 17.1 | | | 18.4 | | | 23.2 | |
| Approach LOS | | D | | | B | | | B | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 35.3 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.90 | | |
| Actuated Cycle Length (s) | 61.9 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 91.8% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|-------|-------|------|------|------|-------|------|------|------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 311 | 4 | 556 | 16 | 5 | 12 | 207 | 402 | 1 | 3 | 452 | 87 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.85 | | 1.00 | 0.89 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 1499 | | 1652 | 1529 | | 1652 | 3240 | 1449 | 1711 | 3284 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 1499 | | 1652 | 1529 | | 1652 | 3240 | 1449 | 1711 | 3284 | | |
| 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) | 338 | 4 | 604 | 17 | 5 | 13 | 225 | 437 | 1 | 3 | 491 | 95 | |
| RTOR Reduction (vph) | 0 | 199 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | 0 | 17 | 0 | |
| Lane Group Flow (vph) | 338 | 409 | 0 | 17 | 8 | 0 | 225 | 437 | 0 | 3 | 569 | 0 | |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% | |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | |
| Parking (#/hr) | | | | 0 | 0 | | | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | | |
| Permitted Phases | | | | | | | | | 8 | | | | |
| Actuated Green, G (s) | 13.4 | 29.0 | | 1.3 | 16.9 | | 9.3 | 31.5 | 31.5 | 0.7 | 22.9 | | |
| Effective Green, g (s) | 13.4 | 29.0 | | 1.3 | 16.9 | | 9.3 | 31.5 | 31.5 | 0.7 | 22.9 | | |
| Actuated g/C Ratio | 0.17 | 0.37 | | 0.02 | 0.21 | | 0.12 | 0.40 | 0.40 | 0.01 | 0.29 | | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| Lane Grp Cap (vph) | 280 | 550 | | 27 | 327 | | 194 | 1291 | 577 | 15 | 951 | | |
| v/s Ratio Prot | c0.20 | c0.27 | | 0.01 | 0.01 | | c0.14 | 0.13 | | 0.00 | c0.17 | | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | | |
| v/c Ratio | 1.21 | 0.74 | | 0.63 | 0.02 | | 1.16 | 0.34 | 0.00 | 0.20 | 0.60 | | |
| Uniform Delay, d1 | 32.8 | 21.8 | | 38.6 | 24.5 | | 34.9 | 16.5 | 14.3 | 38.9 | 24.1 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 121.9 | 6.5 | | 50.7 | 0.1 | | 114.3 | 0.3 | 0.0 | 13.3 | 1.5 | | |
| Delay (s) | 154.7 | 28.2 | | 89.4 | 24.6 | | 149.1 | 16.8 | 14.3 | 52.2 | 25.6 | | |
| Level of Service | F | C | | F | C | | F | B | B | D | C | | |
| Approach Delay (s) | | 73.4 | | | 56.0 | | | 61.7 | | | 25.8 | | |
| Approach LOS | | E | | | E | | | E | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 57.1 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 0.88 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 79.0 | | | | | | | | | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | | | 72.0% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

29: Merced Street/Merced St & Wells Fargo driveway

2020 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↕↕ | | ↕ | ↕↕ | |
| Volume (vph) | 3 | 0 | 0 | 18 | 0 | 74 | 0 | 1232 | 37 | 97 | 1097 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | | 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 | 1.00 | |
| Flt Protected | | 0.95 | | | 0.95 | 1.00 | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1770 | | | 1562 | 1397 | | 4929 | | 1619 | 3470 | |
| Flt Permitted | | 0.74 | | | 0.76 | 1.00 | | 1.00 | | 0.18 | 1.00 | |
| Satd. Flow (perm) | | 1386 | | | 1243 | 1397 | | 4929 | | 306 | 3470 | |
| 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) | 3 | 0 | 0 | 20 | 0 | 80 | 0 | 1339 | 40 | 105 | 1192 | 2 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 2 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 3 | 0 | 0 | 20 | 6 | 0 | 1377 | 0 | 105 | 1194 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 8.9 | | | 8.9 | 8.9 | | 92.5 | | 92.5 | 92.5 | |
| Effective Green, g (s) | | 8.9 | | | 8.9 | 8.9 | | 92.5 | | 92.5 | 92.5 | |
| Actuated g/C Ratio | | 0.08 | | | 0.08 | 0.08 | | 0.84 | | 0.84 | 0.84 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 112 | | | 100 | 113 | | 4144 | | 257 | 2917 | |
| v/s Ratio Prot | | | | | | | | 0.28 | | | c0.34 | |
| v/s Ratio Perm | | 0.00 | | | c0.02 | 0.00 | | | | 0.34 | | |
| v/c Ratio | | 0.03 | | | 0.20 | 0.06 | | 0.33 | | 0.41 | 0.41 | |
| Uniform Delay, d1 | | 46.6 | | | 47.2 | 46.7 | | 1.9 | | 2.1 | 2.1 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 0.57 | | 1.28 | 1.27 | |
| Incremental Delay, d2 | | 0.1 | | | 1.0 | 0.2 | | 0.2 | | 2.1 | 0.2 | |
| Delay (s) | | 46.7 | | | 48.2 | 46.9 | | 1.3 | | 4.8 | 2.9 | |
| Level of Service | | D | | | D | D | | A | | A | A | |
| Approach Delay (s) | | 46.7 | | | 47.2 | | | 1.3 | | | 3.0 | |
| Approach LOS | | D | | | D | | | A | | | A | |





















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.8 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 49.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Merced Street & Republic Ave

2020 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|----------------------|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  | | | |
| Volume (vph) | 54 | 7 | 17 | 143 | 7 | 467 | 2 | 990 | 138 | 344 | 838 | 41 | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (prot) | | 1712 | | | 1778 | 2787 | 1736 | 3471 | 1583 | 3433 | 3443 | | | |
| Flt Permitted | | 0.62 | | | 0.70 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (perm) | | 1097 | | | 1296 | 2787 | 1736 | 3471 | 1583 | 3433 | 3443 | | | |
| 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) | 59 | 8 | 18 | 155 | 8 | 508 | 2 | 1076 | 150 | 374 | 911 | 45 | | |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 0 | 412 | 0 | 0 | 44 | 0 | 2 | 0 | | |
| Lane Group Flow (vph) | 0 | 75 | 0 | 0 | 163 | 96 | 2 | 1076 | 106 | 374 | 954 | 0 | | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | | |
| Actuated Green, G (s) | | 20.8 | | | 20.8 | 20.8 | 1.2 | 58.4 | 58.4 | 17.3 | 74.5 | | | |
| Effective Green, g (s) | | 20.8 | | | 20.8 | 20.8 | 1.2 | 58.4 | 58.4 | 17.3 | 74.5 | | | |
| Actuated g/C Ratio | | 0.19 | | | 0.19 | 0.19 | 0.01 | 0.53 | 0.53 | 0.16 | 0.68 | | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | | 207 | | | 245 | 526 | 18 | 1842 | 840 | 539 | 2331 | | | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.31 | | c0.11 | 0.28 | | | |
| v/s Ratio Perm | | 0.07 | | | c0.13 | 0.03 | | | 0.07 | | | | | |
| v/c Ratio | | 0.36 | | | 0.67 | 0.18 | 0.11 | 0.58 | 0.13 | 0.69 | 0.41 | | | |
| Uniform Delay, d1 | | 38.8 | | | 41.4 | 37.5 | 53.9 | 17.5 | 13.0 | 43.8 | 7.9 | | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.79 | 0.56 | 0.35 | 0.77 | 1.73 | | | |
| Incremental Delay, d2 | | 1.1 | | | 6.7 | 0.2 | 2.5 | 1.2 | 0.3 | 3.7 | 0.5 | | | |
| Delay (s) | | 39.9 | | | 48.0 | 37.6 | 45.2 | 11.0 | 4.8 | 37.5 | 14.2 | | | |
| Level of Service | | D | | | D | D | D | B | A | D | B | | | |
| Approach Delay (s) | | 39.9 | | | 40.2 | | | 10.3 | | | 20.7 | | | |
| Approach LOS | | D | | | D | | | B | | | C | | | |
| Intersection Summary | | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.3 | | | | | | | | | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | | | 0.62 | | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 60.0% | | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 31: Merced St/Merced Street & West Ave 140th

2020 PM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 47 | 41 | 13 | 694 | 811 | 30 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3222 | |
| Flt Permitted | 0.95 | 1.00 | 0.31 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 541 | 3240 | 3222 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 51 | 45 | 14 | 754 | 882 | 33 |
| RTOR Reduction (vph) | 0 | 41 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 51 | 4 | 14 | 754 | 911 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 5.0 | 5.0 | 41.0 | 41.0 | 41.0 | |
| Effective Green, g (s) | 5.0 | 5.0 | 41.0 | 41.0 | 41.0 | |
| Actuated g/C Ratio | 0.09 | 0.09 | 0.75 | 0.75 | 0.75 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 150 | 120 | 403 | 2415 | 2401 | |
| v/s Ratio Prot | c0.03 | | | 0.23 | c0.28 | |
| v/s Ratio Perm | | 0.00 | 0.03 | | | |
| v/c Ratio | 0.34 | 0.03 | 0.03 | 0.31 | 0.38 | |
| Uniform Delay, d1 | 23.5 | 22.8 | 1.8 | 2.3 | 2.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.47 | |
| Incremental Delay, d2 | 1.4 | 0.1 | 0.2 | 0.3 | 0.3 | |
| Delay (s) | 24.8 | 22.9 | 2.0 | 2.7 | 1.5 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.6 | 1.5 | |
| Approach LOS | C | | | A | A | |

Intersection Summary






























| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.2 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.38 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 34.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2020 + Project Saturday

















HCM Signalized Intersection Capacity Analysis
1: Doolittle Dr & Davis St

2020 SAT+ Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|--|---|--|---|---|---|---|---|--|--|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |   | |   |  |  |  |    |  |   |   |  | |
| Volume (vph) | 12 | 74 | 14 | 147 | 74 | 345 | 20 | 286 | 280 | 460 | 399 | 25 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3113 | | 3255 | 1689 | 1490 | 1620 | 4655 | 1435 | 3143 | 3206 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3113 | | 3255 | 1689 | 1490 | 1620 | 4655 | 1435 | 3143 | 3206 | | |
| 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) | 13 | 80 | 15 | 160 | 80 | 375 | 22 | 311 | 304 | 500 | 434 | 27 | |
| RTOR Reduction (vph) | 0 | 13 | 0 | 0 | 0 | 187 | 0 | 0 | 183 | 0 | 3 | 0 | |
| Lane Group Flow (vph) | 13 | 82 | 0 | 160 | 80 | 188 | 22 | 311 | 121 | 500 | 458 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 0.8 | 11.1 | | 9.1 | 19.4 | 34.7 | 3.6 | 18.6 | 27.7 | 15.3 | 30.3 | | |
| Effective Green, g (s) | 0.8 | 11.1 | | 9.1 | 19.4 | 34.7 | 3.6 | 18.6 | 27.7 | 15.3 | 30.3 | | |
| Actuated g/C Ratio | 0.01 | 0.16 | | 0.13 | 0.28 | 0.50 | 0.05 | 0.27 | 0.40 | 0.22 | 0.44 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 19 | 497 | | 426 | 472 | 745 | 84 | 1247 | 572 | 692 | 1399 | | |
| v/s Ratio Prot | 0.01 | 0.03 | | c0.05 | 0.05 | c0.06 | 0.01 | c0.07 | 0.03 | c0.16 | c0.14 | | |
| v/s Ratio Perm | | | | | | 0.07 | | | 0.06 | | | | |
| v/c Ratio | 0.68 | 0.17 | | 0.38 | 0.17 | 0.25 | 0.26 | 0.25 | 0.21 | 0.72 | 0.33 | | |
| Uniform Delay, d1 | 34.2 | 25.2 | | 27.6 | 18.9 | 9.9 | 31.6 | 19.9 | 13.7 | 25.1 | 12.9 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 58.7 | 0.2 | | 0.2 | 0.2 | 0.1 | 0.6 | 0.1 | 0.1 | 3.2 | 0.2 | | |
| Delay (s) | 92.9 | 25.3 | | 27.8 | 19.1 | 10.0 | 32.2 | 20.1 | 13.8 | 28.3 | 13.1 | | |
| Level of Service | F | C | | C | B | A | C | C | B | C | B | | |
| Approach Delay (s) | | 33.4 | | | 15.8 | | | 17.5 | | | 21.0 | | |
| Approach LOS | | C | | | B | | | B | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 19.2 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.44 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 69.4 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 45.1% | | | | | | | | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2020 SAT+ Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 24 | 395 | 14 | 22 | 596 | 18 | 19 | 18 | 40 | 14 | 18 | 24 |
| 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 |
| Hourly flow rate (vph) | 26 | 429 | 15 | 24 | 648 | 20 | 21 | 20 | 43 | 15 | 20 | 26 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 471 | 691 | 84 | 61 | | | | | | | | |
| Volume Left (vph) | 26 | 24 | 21 | 15 | | | | | | | | |
| Volume Right (vph) | 15 | 20 | 43 | 26 | | | | | | | | |
| Hadj (s) | 0.03 | 0.02 | -0.23 | -0.17 | | | | | | | | |
| Departure Headway (s) | 5.4 | 5.1 | 6.7 | 6.9 | | | | | | | | |
| Degree Utilization, x | 0.70 | 0.98 | 0.16 | 0.12 | | | | | | | | |
| Capacity (veh/h) | 471 | 697 | 504 | 485 | | | | | | | | |
| Control Delay (s) | 20.0 | 51.3 | 10.9 | 10.8 | | | | | | | | |
| Approach Delay (s) | 20.0 | 51.3 | 10.9 | 10.8 | | | | | | | | |
| Approach LOS | C | F | B | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 35.6 | | | | | | | | | |
| Level of Service | | | E | | | | | | | | | |
| Intersection Capacity Utilization | | | 51.9% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2020 SAT+ Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 186 | 307 | 52 | 203 | 455 | 159 | 50 | 254 | 179 | 153 | 266 | 231 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1451 | 1620 | 1739 | 1399 | 1652 | 3240 | 1332 | 1620 | 2852 | 2852 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1451 | 1620 | 1739 | 1399 | 1652 | 3240 | 1332 | 1620 | 2852 | 2852 | |
| 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) | 202 | 334 | 57 | 221 | 495 | 173 | 54 | 276 | 195 | 166 | 289 | 251 | |
| RTOR Reduction (vph) | 0 | 0 | 42 | 0 | 0 | 90 | 0 | 0 | 160 | 0 | 125 | 0 | |
| Lane Group Flow (vph) | 202 | 334 | 15 | 221 | 495 | 83 | 54 | 276 | 35 | 166 | 415 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 17.8 | 24.8 | 24.8 | 19.2 | 26.2 | 26.2 | 8.1 | 17.1 | 17.1 | 16.5 | 25.5 | 25.5 | |
| Effective Green, g (s) | 17.8 | 24.8 | 24.8 | 19.2 | 26.2 | 26.2 | 8.1 | 17.1 | 17.1 | 16.5 | 25.5 | 25.5 | |
| Actuated g/C Ratio | 0.19 | 0.26 | 0.26 | 0.20 | 0.27 | 0.27 | 0.08 | 0.18 | 0.18 | 0.17 | 0.27 | 0.27 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 307 | 451 | 376 | 325 | 476 | 383 | 139 | 579 | 238 | 279 | 760 | 760 | |
| v/s Ratio Prot | 0.12 | 0.19 | | c0.14 | c0.28 | | 0.03 | 0.09 | | c0.10 | c0.15 | c0.15 | |
| v/s Ratio Perm | | | 0.01 | | | 0.06 | | | 0.03 | | | | |
| v/c Ratio | 0.66 | 0.74 | 0.04 | 0.68 | 1.04 | 0.22 | 0.39 | 0.48 | 0.15 | 0.59 | 0.55 | 0.55 | |
| Uniform Delay, d1 | 36.1 | 32.5 | 26.5 | 35.4 | 34.7 | 26.8 | 41.4 | 35.2 | 33.1 | 36.5 | 30.1 | 30.1 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.6 | 6.8 | 0.1 | 6.2 | 52.0 | 0.4 | 2.4 | 0.8 | 0.4 | 4.0 | 1.0 | 1.0 | |
| Delay (s) | 41.6 | 39.3 | 26.5 | 41.6 | 86.7 | 27.2 | 43.9 | 36.1 | 33.5 | 40.4 | 31.1 | 31.1 | |
| Level of Service | D | D | C | D | F | C | D | D | C | D | C | C | |
| Approach Delay (s) | | 38.9 | | | 63.9 | | | 35.9 | | | 33.3 | | |
| Approach LOS | | D | | | E | | | D | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 45.0 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.78 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.6 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 69.3% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Merced St & Marina Blvd

2020 SAT+ Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|-------|------|-------|-------|------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 47 | 637 | 74 | 773 | 701 | 108 | 99 | 233 | 635 | 167 | 199 | 42 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4583 | | 3255 | 3168 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1471 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4583 | | 3255 | 3168 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1471 | |
| 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) | 51 | 692 | 80 | 840 | 762 | 117 | 108 | 253 | 690 | 182 | 216 | 46 | |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | |
| Lane Group Flow (vph) | 51 | 761 | 0 | 840 | 870 | 0 | 108 | 253 | 690 | 182 | 216 | 9 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 9.1 | 27.8 | | 47.1 | 65.8 | | 15.0 | 26.0 | 73.1 | 12.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 9.1 | 29.3 | | 47.1 | 67.3 | | 15.0 | 27.5 | 73.1 | 12.0 | 24.5 | 24.5 | |
| Actuated g/C Ratio | 0.07 | 0.22 | | 0.36 | 0.51 | | 0.11 | 0.21 | 0.55 | 0.09 | 0.19 | 0.19 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 107 | 1018 | | 1162 | 1616 | | 190 | 699 | 1499 | 296 | 601 | 273 | |
| v/s Ratio Prot | 0.03 | c0.17 | | c0.26 | 0.27 | | c0.06 | 0.08 | c0.26 | c0.06 | 0.07 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 | |
| v/c Ratio | 0.48 | 0.75 | | 0.72 | 0.54 | | 0.57 | 0.36 | 0.46 | 0.61 | 0.36 | 0.03 | |
| Uniform Delay, d1 | 59.1 | 47.9 | | 36.7 | 21.8 | | 55.4 | 44.7 | 17.6 | 57.7 | 46.9 | 44.0 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.5 | 3.2 | | 3.9 | 0.4 | | 11.8 | 0.4 | 0.3 | 9.2 | 0.5 | 0.1 | |
| Delay (s) | 63.6 | 51.1 | | 40.7 | 22.3 | | 67.1 | 45.1 | 17.9 | 66.9 | 47.4 | 44.0 | |
| Level of Service | E | D | | D | C | | E | D | B | E | D | D | |
| Approach Delay (s) | | 51.9 | | | 31.2 | | | 29.5 | | | 55.0 | | |
| Approach LOS | | D | | | C | | | C | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 37.6 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.67 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 131.9 | | | | | | | | | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | | | 74.9% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|-------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↵ | ↑↑ | | ↵ |
| Volume (vph) | 1401 | 91 | 504 | 0 | 0 | 430 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 0.99 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6349 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6349 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1523 | 99 | 548 | 0 | 0 | 467 |
| RTOR Reduction (vph) | 17 | 0 | 0 | 0 | 0 | 4 |
| Lane Group Flow (vph) | 1605 | 0 | 548 | 0 | 0 | 463 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 21.4 | | 19.8 | | | 19.8 |
| Effective Green, g (s) | 21.4 | | 19.8 | | | 19.8 |
| Actuated g/C Ratio | 0.42 | | 0.39 | | | 0.39 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 2679 | | 691 | | | 629 |
| v/s Ratio Prot | c0.25 | | c0.31 | | | 0.29 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.60 | | 0.79 | | | 0.74 |
| Uniform Delay, d1 | 11.3 | | 13.6 | | | 13.2 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.4 | | 6.2 | | | 4.5 |
| Delay (s) | 11.7 | | 19.9 | | | 17.7 |
| Level of Service | B | | B | | | B |
| Approach Delay (s) | 11.7 | | | 19.9 | 17.7 | |
| Approach LOS | B | | | B | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.69 | | |
| Actuated Cycle Length (s) | 50.7 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 57.7% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020 SAT+ Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|------|------|-------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1201 | 538 | 476 | 952 | 0 | 0 | 0 | 480 | 0 | 0 | 1042 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1305 | 585 | 517 | 1035 | 0 | 0 | 0 | 522 | 0 | 0 | 1133 | |
| RTOR Reduction (vph) | 0 | 0 | 310 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | |
| Lane Group Flow (vph) | 0 | 1305 | 275 | 517 | 1035 | 0 | 0 | 0 | 522 | 0 | 0 | 971 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 46.2 | 46.2 | 16.5 | 69.7 | | | | 32.5 | | | 32.5 | |
| Effective Green, g (s) | | 46.2 | 46.2 | 16.5 | 69.7 | | | | 32.5 | | | 32.5 | |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.15 | 0.64 | | | | 0.30 | | | 0.30 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1425 | 1122 | 477 | 2151 | | | | 871 | | | 833 | |
| v/s Ratio Prot | | c0.39 | | c0.16 | 0.31 | | | | 0.18 | | | c0.35 | |
| v/s Ratio Perm | | | 0.10 | | | | | | | | | | |
| v/c Ratio | | 0.92 | 0.24 | 1.08 | 0.48 | | | | 0.60 | | | 1.17 | |
| Uniform Delay, d1 | | 29.4 | 20.1 | 46.1 | 10.1 | | | | 32.5 | | | 38.1 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 9.4 | 0.1 | 65.7 | 0.2 | | | | 1.1 | | | 87.5 | |
| Delay (s) | | 38.8 | 20.2 | 111.8 | 10.3 | | | | 33.7 | | | 125.6 | |
| Level of Service | | D | C | F | B | | | | C | | | F | |
| Approach Delay (s) | | 33.1 | | | 44.1 | | | 33.7 | | | 125.6 | | |
| Approach LOS | | C | | | D | | | C | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 57.1 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 1.03 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 108.7 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 69.9% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

2020 SAT+ Project




















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 452 | 0 | 876 | 519 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 491 | 0 | 952 | 564 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 108 | 0 | 0 |
| Lane Group Flow (vph) | 491 | 0 | 952 | 456 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 18.0 | | 21.3 | 21.3 | | |
| Effective Green, g (s) | 18.0 | | 21.3 | 21.3 | | |
| Actuated g/C Ratio | 0.37 | | 0.44 | 0.44 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 603 | | 1479 | 675 | | |
| v/s Ratio Prot | c0.30 | | 0.28 | | | |
| v/s Ratio Perm | | | | c0.30 | | |
| v/c Ratio | 0.81 | | 0.64 | 0.67 | | |
| Uniform Delay, d1 | 13.6 | | 10.5 | 10.7 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 8.3 | | 1.0 | 2.7 | | |
| Delay (s) | 21.9 | | 11.5 | 13.4 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 21.9 | 12.2 | | 0.0 | |
| Approach LOS | | C | B | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.74 | | |
| Actuated Cycle Length (s) | 48.3 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 64.7% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2020 SAT+ Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 13 | 219 | 19 | 25 | 242 | 24 | 26 | 18 | 32 | 16 | 9 | 15 |
| 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 |
| Hourly flow rate (vph) | 14 | 238 | 21 | 27 | 263 | 26 | 28 | 20 | 35 | 17 | 10 | 16 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 14 | 259 | 316 | 83 | 43 | | | | | | | |
| Volume Left (vph) | 14 | 0 | 27 | 28 | 17 | | | | | | | |
| Volume Right (vph) | 0 | 21 | 26 | 35 | 16 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | 0.00 | -0.15 | -0.11 | | | | | | | |
| Departure Headway (s) | 5.7 | 5.1 | 4.7 | 5.2 | 5.3 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.37 | 0.41 | 0.12 | 0.06 | | | | | | | |
| Capacity (veh/h) | 618 | 683 | 741 | 616 | 591 | | | | | | | |
| Control Delay (s) | 7.6 | 9.8 | 10.9 | 8.9 | 8.7 | | | | | | | |
| Approach Delay (s) | 9.7 | | 10.9 | 8.9 | 8.7 | | | | | | | |
| Approach LOS | A | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.1 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 43.6% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
23: Doolittle Dr & Fairway Drive/Fairway Dr

2020 SAT+ Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 68 | 162 | 82 | 72 | 174 | 154 | 101 | 271 | 74 | 107 | 273 | 66 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.97 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1710 | 1261 | 1620 | 1739 | 1319 | 1711 | 2965 | | 1620 | 2984 | |
| Flt Permitted | | 0.85 | 1.00 | 0.58 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1471 | 1261 | 981 | 1739 | 1319 | 1711 | 2965 | | 1620 | 2984 | |
| 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) | 74 | 176 | 89 | 78 | 189 | 167 | 110 | 295 | 80 | 116 | 297 | 72 |
| RTOR Reduction (vph) | 0 | 0 | 62 | 0 | 0 | 116 | 0 | 36 | 0 | 0 | 31 | 0 |
| Lane Group Flow (vph) | 0 | 250 | 27 | 78 | 189 | 51 | 110 | 339 | 0 | 116 | 338 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 7.2 | 13.1 | | 7.5 | 13.4 | |
| Effective Green, g (s) | | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 7.2 | 13.1 | | 7.5 | 13.4 | |
| Actuated g/C Ratio | | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.14 | 0.26 | | 0.15 | 0.26 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 446 | 382 | 297 | 527 | 400 | 241 | 760 | | 237 | 782 | |
| v/s Ratio Prot | | | | | 0.11 | | 0.06 | c0.11 | | c0.07 | 0.11 | |
| v/s Ratio Perm | | c0.17 | 0.02 | 0.08 | | 0.04 | | | | | | |
| v/c Ratio | | 0.56 | 0.07 | 0.26 | 0.36 | 0.13 | 0.46 | 0.45 | | 0.49 | 0.43 | |
| Uniform Delay, d1 | | 14.9 | 12.7 | 13.5 | 13.9 | 12.9 | 20.2 | 16.0 | | 20.0 | 15.7 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.6 | 0.1 | 0.5 | 0.4 | 0.1 | 1.4 | 0.6 | | 1.6 | 0.5 | |
| Delay (s) | | 16.6 | 12.8 | 13.9 | 14.3 | 13.0 | 21.5 | 16.5 | | 21.6 | 16.2 | |
| Level of Service | | B | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 15.6 | | | 13.8 | | | 17.7 | | | 17.5 | |
| Approach LOS | | B | | | B | | | B | | | B | |

























Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.50 | | |
| Actuated Cycle Length (s) | 51.1 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 59.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Merced Street & Fairway Dr

2020 SAT+ Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 123 | 191 | 103 | 72 | 257 | 79 | 100 | 452 | 73 | 68 | 460 | 98 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3162 | | 1593 | 3139 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3162 | | 1593 | 3139 | |
| 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) | 134 | 208 | 112 | 78 | 279 | 86 | 109 | 491 | 79 | 74 | 500 | 107 |
| RTOR Reduction (vph) | 0 | 0 | 85 | 0 | 0 | 66 | 0 | 9 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 134 | 208 | 27 | 78 | 279 | 20 | 109 | 561 | 0 | 74 | 594 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 15.9 | 27.4 | 27.4 | 15.5 | 27.0 | 27.0 | 12.5 | 43.3 | | 9.5 | 40.3 | |
| Effective Green, g (s) | 15.9 | 27.4 | 27.4 | 15.5 | 27.0 | 27.0 | 12.5 | 43.3 | | 9.5 | 40.3 | |
| Actuated g/C Ratio | 0.14 | 0.24 | 0.24 | 0.14 | 0.24 | 0.24 | 0.11 | 0.38 | | 0.08 | 0.35 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 218 | 440 | 311 | 215 | 438 | 318 | 180 | 1193 | | 131 | 1102 | |
| v/s Ratio Prot | c0.08 | 0.11 | | 0.05 | c0.15 | | c0.07 | 0.18 | | 0.05 | c0.19 | |
| v/s Ratio Perm | | | 0.02 | | | 0.01 | | | | | | |
| v/c Ratio | 0.61 | 0.47 | 0.09 | 0.36 | 0.64 | 0.06 | 0.61 | 0.47 | | 0.56 | 0.54 | |
| Uniform Delay, d1 | 46.5 | 37.5 | 33.9 | 45.1 | 39.4 | 34.0 | 48.7 | 27.0 | | 50.6 | 29.8 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.8 | 1.1 | 0.2 | 1.4 | 3.4 | 0.1 | 6.5 | 1.3 | | 6.6 | 1.2 | |
| Delay (s) | 52.3 | 38.5 | 34.1 | 46.5 | 42.8 | 34.2 | 55.3 | 28.4 | | 57.2 | 31.0 | |
| Level of Service | D | D | C | D | D | C | E | C | | E | C | |
| Approach Delay (s) | | 41.5 | | | 41.8 | | | 32.7 | | | 33.8 | |
| Approach LOS | | D | | | D | | | C | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 36.6 | | | | HCM 2000 Level of Service | | | | D | |
| HCM 2000 Volume to Capacity ratio | | | 0.59 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 114.7 | | | Sum of lost time (s) | | | | 19.0 | | |
| Intersection Capacity Utilization | | | 63.9% | | | ICU Level of Service | | | | B | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

2035 AM

HCM Signalized Intersection Capacity Analysis

2035 AM

1: Doolittle Dr & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|------|-------|------|-------|-------|------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↖ | ↖ | ↖ | ↖ | ↖ | ↖ | ↗ | ↗ |
| Volume (vph) | 26 | 97 | 34 | 428 | 113 | 928 | 45 | 751 | 374 | 783 | 296 | 44 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3069 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1436 | 3143 | 3165 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3069 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1436 | 3143 | 3165 | |
| 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) | 28 | 105 | 37 | 465 | 123 | 1009 | 49 | 816 | 407 | 851 | 322 | 48 |
| RTOR Reduction (vph) | 0 | 32 | 0 | 0 | 0 | 158 | 0 | 0 | 201 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 28 | 110 | 0 | 465 | 123 | 851 | 49 | 816 | 206 | 851 | 362 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 2.8 | 14.2 | | 16.6 | 28.0 | 54.9 | 17.1 | 24.4 | 41.0 | 26.9 | 34.2 | |
| Effective Green, g (s) | 2.8 | 14.2 | | 16.6 | 28.0 | 54.9 | 17.1 | 24.4 | 41.0 | 26.9 | 34.2 | |
| Actuated g/C Ratio | 0.03 | 0.15 | | 0.17 | 0.29 | 0.56 | 0.18 | 0.25 | 0.42 | 0.28 | 0.35 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 48 | 447 | | 554 | 485 | 840 | 284 | 1166 | 604 | 868 | 1111 | |
| v/s Ratio Prot | 0.02 | 0.04 | | c0.14 | 0.07 | c0.28 | 0.03 | c0.18 | 0.06 | 0.27 | 0.11 | |
| v/s Ratio Perm | | | | | | 0.29 | | | 0.09 | | | |
| v/c Ratio | 0.58 | 0.25 | | 0.84 | 0.25 | 1.01 | 0.17 | 0.70 | 0.34 | 0.98 | 0.33 | |
| Uniform Delay, d1 | 46.7 | 36.9 | | 39.1 | 26.7 | 21.3 | 34.1 | 33.2 | 19.1 | 35.0 | 23.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 11.1 | 0.3 | | 10.3 | 0.3 | 34.2 | 0.1 | 2.0 | 0.1 | 25.6 | 0.3 | |
| Delay (s) | 57.8 | 37.2 | | 49.4 | 26.9 | 55.5 | 34.2 | 35.2 | 19.2 | 60.6 | 23.4 | |
| Level of Service | E | D | | D | C | E | C | D | B | E | C | |
| Approach Delay (s) | | 40.6 | | | 51.5 | | | 30.0 | | | 49.3 | |
| Approach LOS | | D | | | D | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 44.0 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.92 | | |
| Actuated Cycle Length (s) | 97.4 | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | 87.0% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2035 AM

2: Phillips Ln & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|-------|-------|------|------|-------|------|------|
| Lane Configurations | ↰ | ↕ | | ↰ | ↕ | ↗ | ↰ | ↕ | | ↰ | ↕ | ↗ |
| Volume (vph) | 73 | 1175 | 9 | 21 | 1542 | 120 | 24 | 1 | 90 | 91 | 1 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3175 | | 1620 | 3070 | 1323 | 1678 | 1432 | | 3143 | 1395 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.33 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3175 | | 1620 | 3070 | 1323 | 574 | 1432 | | 3143 | 1395 | |
| 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) | 79 | 1277 | 10 | 23 | 1676 | 130 | 26 | 1 | 98 | 99 | 1 | 58 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 39 | 0 | 87 | 0 | 0 | 50 | 0 |
| Lane Group Flow (vph) | 79 | 1287 | 0 | 23 | 1689 | 78 | 26 | 12 | 0 | 99 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 9.5 | 61.6 | | 4.3 | 56.4 | 70.2 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Effective Green, g (s) | 9.5 | 61.6 | | 4.3 | 56.4 | 70.2 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.09 | 0.59 | | 0.04 | 0.54 | 0.67 | 0.12 | 0.12 | | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 146 | 1862 | | 66 | 1649 | 884 | 67 | 167 | | 413 | 183 | |
| v/s Ratio Prot | c0.05 | 0.41 | | 0.01 | c0.55 | 0.01 | | 0.01 | | c0.03 | | |
| v/s Ratio Perm | | | | | | 0.05 | c0.05 | | | | | 0.01 |
| v/c Ratio | 0.54 | 0.69 | | 0.35 | 1.02 | 0.09 | 0.39 | 0.07 | | 0.24 | 0.05 | |
| Uniform Delay, d1 | 45.7 | 15.1 | | 49.0 | 24.3 | 6.1 | 42.9 | 41.3 | | 40.9 | 39.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.24 | 0.58 | 1.45 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 2.1 | | 0.9 | 26.3 | 0.0 | 1.4 | 0.1 | | 0.3 | 0.1 | |
| Delay (s) | 47.9 | 17.2 | | 61.9 | 40.4 | 8.9 | 44.2 | 41.4 | | 41.2 | 40.0 | |
| Level of Service | D | B | | E | D | A | D | D | | D | D | |
| Approach Delay (s) | | 19.0 | | | 38.7 | | | 41.9 | | | 40.7 | |
| Approach LOS | | B | | | D | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 31.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.77 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 77.2% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|-------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↵ | ↑↑↑ | | ↵↵ | ↑↑↑ | | | ↑ | ↵↵ | ↵ | ↑ | |
| Volume (vph) | 6 | 1302 | 52 | 257 | 1624 | 43 | 65 | 30 | 151 | 119 | 56 | 23 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.91 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.97 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4541 | | 3143 | 4755 | | | 1826 | 2808 | 1562 | 1554 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.75 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4541 | | 3143 | 4755 | | | 1407 | 2808 | 1562 | 1554 | |
| 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) | 7 | 1415 | 57 | 279 | 1765 | 47 | 71 | 33 | 164 | 129 | 61 | 25 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 122 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 7 | 1468 | 0 | 279 | 1810 | 0 | 0 | 104 | 42 | 129 | 72 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 1.0 | 50.9 | | 14.6 | 65.0 | | | 12.2 | 26.8 | 13.8 | 13.8 | |
| Effective Green, g (s) | 1.0 | 50.9 | | 14.6 | 65.0 | | | 12.2 | 26.8 | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.01 | 0.48 | | 0.14 | 0.62 | | | 0.12 | 0.26 | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 15 | 2201 | | 437 | 2943 | | | 163 | 716 | 205 | 204 | |
| v/s Ratio Prot | c0.00 | c0.32 | | 0.09 | c0.38 | | | | 0.01 | c0.08 | 0.05 | |
| v/s Ratio Perm | | | | | | | | c0.07 | 0.01 | | | |
| v/c Ratio | 0.47 | 0.67 | | 0.64 | 0.61 | | | 0.64 | 0.06 | 0.63 | 0.35 | |
| Uniform Delay, d1 | 51.7 | 20.6 | | 42.7 | 12.3 | | | 44.3 | 29.6 | 43.2 | 41.5 | |
| Progression Factor | 0.68 | 0.50 | | 1.16 | 0.87 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.5 | 1.3 | | 0.9 | 0.4 | | | 5.9 | 0.0 | 4.3 | 0.4 | |
| Delay (s) | 41.8 | 11.6 | | 50.5 | 11.1 | | | 50.2 | 29.6 | 47.5 | 41.9 | |
| Level of Service | D | B | | D | B | | | D | C | D | D | |
| Approach Delay (s) | | 11.7 | | | 16.4 | | | 37.6 | | | 45.3 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 17.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 68.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: I-880 SB ramps & Davis St/Davis Street

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|---------------------|------|--------|------|---------------------------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↑↑ | ↑ | | ↑↑ | | | | | ↑ | ↑ | ↑ |
| Volume (vph) | 0 | 847 | 705 | 0 | 1455 | 408 | 0 | 0 | 0 | 194 | 0 | 506 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.97 | | | | | 1.00 | 0.86 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3123 | | | | | 1681 | 1416 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3123 | | | | | 1681 | 1416 | 1461 |
| 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 | 921 | 766 | 0 | 1582 | 443 | 0 | 0 | 0 | 211 | 0 | 550 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 17 | 17 |
| Lane Group Flow (vph) | 0 | 921 | 766 | 0 | 2004 | 0 | 0 | 0 | 0 | 190 | 268 | 269 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 65.3 | 105.0 | | 65.3 | | | | | 31.7 | 31.7 | 31.7 |
| Effective Green, g (s) | | 65.3 | 105.0 | | 65.3 | | | | | 31.7 | 31.7 | 31.7 |
| Actuated g/C Ratio | | 0.62 | 1.00 | | 0.62 | | | | | 0.30 | 0.30 | 0.30 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2047 | 1439 | | 1942 | | | | | 507 | 427 | 441 |
| v/s Ratio Prot | | 0.28 | | | c0.64 | | | | | 0.11 | c0.19 | 0.18 |
| v/s Ratio Perm | | | 0.53 | | | | | | | | | |
| v/c Ratio | | 0.45 | 0.53 | | 1.03 | | | | | 0.37 | 0.63 | 0.61 |
| Uniform Delay, d1 | | 10.4 | 0.0 | | 19.9 | | | | | 28.8 | 31.6 | 31.4 |
| Progression Factor | | 0.55 | 1.00 | | 0.91 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.6 | 0.3 | | 27.6 | | | | | 0.5 | 2.9 | 2.5 |
| Delay (s) | | 6.3 | 0.3 | | 45.7 | | | | | 29.3 | 34.5 | 33.9 |
| Level of Service | | A | A | | D | | | | | C | C | C |
| Approach Delay (s) | | 3.6 | | | 45.7 | | | 0.0 | | | 33.0 | |
| Approach LOS | | A | | | D | | | A | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 27.6 | | HCM 2000 Level of Service | | | | | C | | |
| HCM 2000 Volume to Capacity ratio | | | 0.90 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | | | | 8.0 | | | |
| Intersection Capacity Utilization | | | 80.8% | | ICU Level of Service | | | | D | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

2035 AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------|------|------|-------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↘↘ | ↗ |
| Volume (vph) | 579 | 635 | 0 | 1311 | 525 | 185 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Fr _t | 0.92 | | | 1.00 | 0.99 | 0.85 |
| Fl _t Protected | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3261 | | | 3539 | 3430 | 1441 |
| Fl _t Permitted | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3261 | | | 3539 | 3430 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 629 | 690 | 0 | 1425 | 571 | 201 |
| RTOR Reduction (vph) | 129 | 0 | 0 | 0 | 3 | 142 |
| Lane Group Flow (vph) | 1190 | 0 | 0 | 1425 | 588 | 39 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 75.1 | | | 75.1 | 22.9 | 22.9 |
| Effective Green, g (s) | 75.1 | | | 75.1 | 22.9 | 22.9 |
| Actuated g/C Ratio | 0.72 | | | 0.72 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2332 | | | 2531 | 748 | 314 |
| v/s Ratio Prot | 0.36 | | | c0.40 | c0.17 | 0.03 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.51 | | | 0.56 | 0.79 | 0.13 |
| Uniform Delay, d ₁ | 6.7 | | | 7.1 | 38.7 | 33.0 |
| Progression Factor | 0.74 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d ₂ | 0.8 | | | 0.9 | 5.0 | 0.1 |
| Delay (s) | 5.7 | | | 8.0 | 43.8 | 33.1 |
| Level of Service | A | | | A | D | C |
| Approach Delay (s) | 5.7 | | | 8.0 | 41.3 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.62 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 60.0% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2035 AM

6: Doolittle Dr & Williams St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↔ | | ↕ | ↕↔ | |
| Volume (vph) | 104 | 126 | 19 | 80 | 88 | 140 | 24 | 966 | 83 | 47 | 505 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | | 0.98 | | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1533 | | | 1691 | 1303 | 1620 | 3036 | | 1562 | 3020 | |
| Flt Permitted | | 0.75 | | | 0.72 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1166 | | | 1253 | 1303 | 1620 | 3036 | | 1562 | 3020 | |
| 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) | 113 | 137 | 21 | 87 | 96 | 152 | 26 | 1050 | 90 | 51 | 549 | 64 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 110 | 0 | 7 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 0 | 267 | 0 | 0 | 183 | 42 | 26 | 1133 | 0 | 51 | 604 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | 5 | | 2 | 2 | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | |
| Actuated Green, G (s) | | 19.3 | | | 19.3 | 19.3 | 3.2 | 31.5 | | 5.5 | 33.3 | |
| Effective Green, g (s) | | 19.3 | | | 19.3 | 19.3 | 3.2 | 31.5 | | 5.5 | 33.3 | |
| Actuated g/C Ratio | | 0.28 | | | 0.28 | 0.28 | 0.05 | 0.45 | | 0.08 | 0.48 | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | | 323 | | | 347 | 361 | 74 | 1376 | | 123 | 1446 | |
| v/s Ratio Prot | | | | | | | 0.02 | c0.37 | | c0.03 | 0.20 | |
| v/s Ratio Perm | | c0.23 | | | 0.15 | 0.03 | | | | | | |
| v/c Ratio | | 0.83 | | | 0.53 | 0.12 | 0.35 | 0.82 | | 0.41 | 0.42 | |
| Uniform Delay, d1 | | 23.5 | | | 21.2 | 18.7 | 32.1 | 16.6 | | 30.5 | 11.8 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 16.5 | | | 1.9 | 0.2 | 3.9 | 4.3 | | 3.1 | 0.3 | |
| Delay (s) | | 40.1 | | | 23.1 | 18.9 | 36.0 | 20.9 | | 33.5 | 12.1 | |
| Level of Service | | D | | | C | B | D | C | | C | B | |
| Approach Delay (s) | | 40.1 | | | 21.2 | | | 21.3 | | | 13.7 | |
| Approach LOS | | D | | | C | | | C | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 21.3 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.79 | | |
| Actuated Cycle Length (s) | 69.5 | Sum of lost time (s) | 13.7 |
| Intersection Capacity Utilization | 68.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

2035 AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 28 | 250 | 359 | 183 | 148 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 30 | 272 | 390 | 199 | 161 | 64 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 54 | 0 | 54 |
| Lane Group Flow (vph) | 30 | 272 | 390 | 145 | 161 | 10 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 4.6 | 84.8 | 76.2 | 76.2 | 16.6 | 16.6 |
| Effective Green, g (s) | 4.6 | 84.8 | 76.2 | 76.2 | 16.6 | 16.6 |
| Actuated g/C Ratio | 0.04 | 0.77 | 0.69 | 0.69 | 0.15 | 0.15 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 67 | 1408 | 1181 | 1078 | 235 | 203 |
| v/s Ratio Prot | c0.02 | 0.15 | c0.23 | | c0.10 | |
| v/s Ratio Perm | | | | 0.09 | | 0.01 |
| v/c Ratio | 0.45 | 0.19 | 0.33 | 0.13 | 0.69 | 0.05 |
| Uniform Delay, d1 | 51.5 | 3.4 | 6.7 | 5.7 | 44.2 | 39.9 |
| Progression Factor | 1.00 | 1.00 | 1.12 | 1.55 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.7 | 0.3 | 0.6 | 0.2 | 8.0 | 0.1 |
| Delay (s) | 53.2 | 3.7 | 8.2 | 9.1 | 52.2 | 40.0 |
| Level of Service | D | A | A | A | D | D |
| Approach Delay (s) | | 8.6 | 8.5 | | 48.8 | |
| Approach LOS | | A | A | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.40 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 39.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBT | EBR | WBL | WBT | WBR | NBL2 | NBL | NBR | SBT | SEL | SER |
|------------------------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | ↑ | ↑ | ↑ | ↑ | | | ↑ | ↑ | ↑ | ↑ | ↑ |
| Volume (vph) | 289 | 124 | 193 | 312 | 1 | 271 | 5 | 220 | 7 | 0 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 9 | 10 | 10 | 11 | 11 | 16 | 12 | 12 | 12 |
| Total Lost time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.97 | 1.00 | 1.00 | | | 1.00 | 0.97 | 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 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.86 | |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| 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 |
| Adj. Flow (vph) | 314 | 135 | 210 | 339 | 1 | 295 | 5 | 239 | 8 | 0 | 8 |
| RTOR Reduction (vph) | 0 | 82 | 0 | 0 | 0 | 0 | 0 | 128 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 314 | 53 | 210 | 340 | 0 | 0 | 300 | 111 | 8 | 8 | 0 |
| Confl. Peds. (#/hr) | | 14 | | | | | | 2 | | 2 | |
| Confl. Bikes (#/hr) | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Turn Type | NA | Perm | Prot | NA | | Prot | Prot | Perm | NA | Prot | |
| Protected Phases | 2 | | 1 | 6 | | 4 | 4 | | 8 | 7 | |
| Permitted Phases | | 2 | | | | | | 4 | | | |
| Actuated Green, G (s) | 42.8 | 42.8 | 18.9 | 65.7 | | | 23.9 | 23.9 | 1.4 | 2.4 | |
| Effective Green, g (s) | 42.8 | 42.8 | 18.9 | 65.7 | | | 23.9 | 23.9 | 1.4 | 2.4 | |
| Actuated g/C Ratio | 0.39 | 0.39 | 0.17 | 0.60 | | | 0.22 | 0.22 | 0.01 | 0.02 | |
| Clearance Time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 684 | 560 | 268 | 1017 | | | 364 | 371 | 23 | 34 | |
| v/s Ratio Prot | c0.18 | | c0.13 | 0.20 | | | c0.18 | | c0.00 | c0.01 | |
| v/s Ratio Perm | | 0.04 | | | | | | 0.07 | | | |
| v/c Ratio | 0.46 | 0.09 | 0.78 | 0.33 | | | 0.82 | 0.30 | 0.35 | 0.24 | |
| Uniform Delay, d1 | 25.0 | 21.3 | 43.6 | 11.1 | | | 41.0 | 36.0 | 53.8 | 52.9 | |
| Progression Factor | 0.93 | 1.05 | 1.00 | 1.00 | | | 0.74 | 0.60 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 0.3 | 13.9 | 0.9 | | | 13.3 | 0.4 | 8.9 | 3.5 | |
| Delay (s) | 25.5 | 22.8 | 57.5 | 12.0 | | | 43.5 | 21.9 | 62.8 | 56.4 | |
| Level of Service | C | C | E | B | | | D | C | E | E | |
| Approach Delay (s) | 24.7 | | | 29.4 | | | | | 62.8 | 56.4 | |
| Approach LOS | C | | | C | | | | | E | E | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 29.9 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.62 | C |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 79.8% | 20.6 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | D |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

2035 AM



















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | ↑ | ↗ | ↘ | |
| Volume (veh/h) | 0 | 80 | 137 | 14 | 35 | 0 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 87 | 149 | 15 | 38 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 164 | | | | 236 | 149 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 164 | | | | 236 | 149 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 95 | 100 |
| cM capacity (veh/h) | 1414 | | | | 752 | 898 |

| Direction, Lane # | EB 1 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|
| Volume Total | 87 | 149 | 15 | 38 |
| Volume Left | 0 | 0 | 0 | 38 |
| Volume Right | 0 | 0 | 15 | 0 |
| cSH | 1700 | 1700 | 1700 | 752 |
| Volume to Capacity | 0.05 | 0.09 | 0.01 | 0.05 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 4 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 10.0 |
| Lane LOS | | | | B |
| Approach Delay (s) | 0.0 | 0.0 | | 10.0 |
| Approach LOS | | | | B |

| Intersection Summary | | | |
|-----------------------------------|--|-------|------------------------|
| Average Delay | | 1.3 | |
| Intersection Capacity Utilization | | 17.2% | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2035 AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 33 | 131 | 10 | 28 | 98 | 80 | 10 | 130 | 52 | 46 | 51 | 14 |
| 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 |
| Hourly flow rate (vph) | 36 | 142 | 11 | 30 | 107 | 87 | 11 | 141 | 57 | 50 | 55 | 15 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 189 | 224 | 209 | 121 | | | | | | | | |
| Volume Left (vph) | 36 | 30 | 11 | 50 | | | | | | | | |
| Volume Right (vph) | 11 | 87 | 57 | 15 | | | | | | | | |
| Hadj (s) | 0.04 | -0.17 | -0.12 | 0.04 | | | | | | | | |
| Departure Headway (s) | 5.1 | 4.9 | 5.0 | 5.3 | | | | | | | | |
| Degree Utilization, x | 0.27 | 0.30 | 0.29 | 0.18 | | | | | | | | |
| Capacity (veh/h) | 646 | 683 | 660 | 610 | | | | | | | | |
| Control Delay (s) | 10.0 | 10.0 | 10.1 | 9.5 | | | | | | | | |
| Approach Delay (s) | 10.0 | 10.0 | 10.1 | 9.5 | | | | | | | | |
| Approach LOS | B | B | B | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.0 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 40.8% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 63 | 210 | 69 | 158 | 151 | 377 | 10 | 650 | 248 | 223 | 343 | 37 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 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 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1448 | 1620 | 1739 | 1394 | 1652 | 3240 | 1332 | 1620 | 3030 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1448 | 1620 | 1739 | 1394 | 1652 | 3240 | 1332 | 1620 | 3030 | |
| 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) | 68 | 228 | 75 | 172 | 164 | 410 | 11 | 707 | 270 | 242 | 373 | 40 |
| RTOR Reduction (vph) | 0 | 0 | 61 | 0 | 0 | 303 | 0 | 0 | 94 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 68 | 228 | 14 | 172 | 164 | 107 | 11 | 707 | 176 | 242 | 408 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 9.3 | 21.0 | 21.0 | 18.1 | 29.8 | 29.8 | 2.9 | 33.1 | 33.1 | 23.5 | 53.7 | |
| Effective Green, g (s) | 9.3 | 21.0 | 21.0 | 18.1 | 29.8 | 29.8 | 2.9 | 33.1 | 33.1 | 23.5 | 53.7 | |
| Actuated g/C Ratio | 0.08 | 0.18 | 0.18 | 0.16 | 0.26 | 0.26 | 0.03 | 0.29 | 0.29 | 0.21 | 0.47 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 135 | 321 | 267 | 257 | 455 | 365 | 42 | 943 | 387 | 334 | 1431 | |
| v/s Ratio Prot | 0.04 | c0.13 | | c0.11 | 0.09 | | 0.01 | c0.22 | | c0.15 | 0.13 | |
| v/s Ratio Perm | | | 0.01 | | | 0.08 | | | 0.13 | | | |
| v/c Ratio | 0.50 | 0.71 | 0.05 | 0.67 | 0.36 | 0.29 | 0.26 | 0.75 | 0.46 | 0.72 | 0.29 | |
| Uniform Delay, d1 | 50.0 | 43.5 | 38.2 | 45.0 | 34.2 | 33.5 | 54.4 | 36.5 | 32.9 | 42.1 | 18.3 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.0 | 7.7 | 0.1 | 7.1 | 0.7 | 0.6 | 4.5 | 3.5 | 1.2 | 8.1 | 0.2 | |
| Delay (s) | 54.0 | 51.2 | 38.3 | 52.1 | 34.9 | 34.2 | 58.9 | 40.1 | 34.1 | 50.2 | 18.4 | |
| Level of Service | D | D | D | D | C | C | E | D | C | D | B | |
| Approach Delay (s) | | 49.1 | | | 38.4 | | | 38.6 | | | 30.2 | |
| Approach LOS | | D | | | D | | | D | | | C | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 38.0 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.72 | D |
| Actuated Cycle Length (s) | 113.7 | Sum of lost time (s) |
| Intersection Capacity Utilization | 65.5% | 18.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | C |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: Merced St & Marina Blvd

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 36 | 621 | 74 | 1054 | 718 | 237 | 109 | 204 | 576 | 164 | 172 | 28 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 4.0 | 4.0 | 5.5 | 5.5 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.98 | | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4581 | | 3255 | 3106 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4581 | | 3255 | 3106 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| 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) | 39 | 675 | 80 | 1146 | 780 | 258 | 118 | 222 | 626 | 178 | 187 | 30 |
| RTOR Reduction (vph) | 0 | 13 | 0 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| Lane Group Flow (vph) | 39 | 742 | 0 | 1146 | 1009 | 0 | 118 | 222 | 626 | 178 | 187 | 6 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 6.9 | 21.0 | | 34.0 | 48.1 | | 13.0 | 25.0 | 63.0 | 11.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 6.9 | 21.0 | | 34.0 | 48.1 | | 13.0 | 25.0 | 63.0 | 11.0 | 23.0 | 23.0 |
| Actuated g/C Ratio | 0.06 | 0.19 | | 0.31 | 0.44 | | 0.12 | 0.23 | 0.57 | 0.10 | 0.21 | 0.21 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 97 | 874 | | 1006 | 1358 | | 198 | 762 | 1549 | 325 | 677 | 307 |
| v/s Ratio Prot | 0.02 | c0.16 | | c0.35 | 0.32 | | c0.07 | 0.07 | c0.23 | 0.05 | 0.06 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 |
| v/c Ratio | 0.40 | 0.85 | | 1.14 | 0.74 | | 0.60 | 0.29 | 0.40 | 0.55 | 0.28 | 0.02 |
| Uniform Delay, d1 | 49.6 | 43.0 | | 38.0 | 25.8 | | 46.0 | 35.2 | 13.1 | 47.1 | 36.5 | 34.6 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.04 | 0.66 | 0.20 | 1.09 | 0.78 | 1.00 |
| Incremental Delay, d2 | 3.7 | 10.1 | | 74.9 | 3.7 | | 12.4 | 0.3 | 0.2 | 6.0 | 0.3 | 0.0 |
| Delay (s) | 53.3 | 53.1 | | 112.9 | 29.5 | | 60.0 | 23.6 | 2.8 | 57.3 | 28.9 | 34.6 |
| Level of Service | D | D | | F | C | | E | C | A | E | C | C |
| Approach Delay (s) | | 53.1 | | | 73.3 | | | 14.6 | | | 42.1 | |
| Approach LOS | | D | | | E | | | B | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 53.7 | HCM 2000 Level of Service D |
| HCM 2000 Volume to Capacity ratio | 0.83 | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) 19.0 |
| Intersection Capacity Utilization | 85.1% | ICU Level of Service E |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2035 AM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑↑↑ | | ↘ | ↑↑ | | ↗ |
| Volume (vph) | 1185 | 13 | 138 | 0 | 0 | 181 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 1.00 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6398 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6398 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1288 | 14 | 150 | 0 | 0 | 197 |
| RTOR Reduction (vph) | 4 | 0 | 0 | 0 | 0 | 42 |
| Lane Group Flow (vph) | 1298 | 0 | 150 | 0 | 0 | 155 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 19.6 | | 6.0 | | | 6.0 |
| Effective Green, g (s) | 19.6 | | 6.0 | | | 6.0 |
| Actuated g/C Ratio | 0.56 | | 0.17 | | | 0.17 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 3572 | | 302 | | | 275 |
| v/s Ratio Prot | c0.20 | | 0.08 | | | c0.10 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.36 | | 0.50 | | | 0.56 |
| Uniform Delay, d1 | 4.3 | | 13.2 | | | 13.3 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.1 | | 1.3 | | | 2.6 |
| Delay (s) | 4.4 | | 14.5 | | | 16.0 |
| Level of Service | A | | B | | | B |
| Approach Delay (s) | 4.4 | | | 14.5 | 16.0 | |
| Approach LOS | A | | | B | B | |

Intersection Summary

| | | | |
|--|-------|---------------------------|-----|
| HCM 2000 Control Delay | 6.7 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.41 | | |
| Actuated Cycle Length (s) | 35.1 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 36.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| Description: WBT Removed as they are not part of signalized intersection | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|------|------|-------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1050 | 539 | 396 | 1282 | 0 | 0 | 0 | 458 | 0 | 0 | 982 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 1141 | 586 | 430 | 1393 | 0 | 0 | 0 | 498 | 0 | 0 | 1067 |
| RTOR Reduction (vph) | 0 | 0 | 351 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71 |
| Lane Group Flow (vph) | 0 | 1141 | 235 | 430 | 1393 | 0 | 0 | 0 | 498 | 0 | 0 | 996 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 35.3 | 35.3 | 12.9 | 55.2 | | | | 26.5 | | | 26.5 |
| Effective Green, g (s) | | 35.3 | 35.3 | 12.9 | 55.2 | | | | 26.5 | | | 26.5 |
| Actuated g/C Ratio | | 0.40 | 0.40 | 0.15 | 0.63 | | | | 0.30 | | | 0.30 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1342 | 1057 | 459 | 2099 | | | | 875 | | | 837 |
| v/s Ratio Prot | | c0.34 | | c0.14 | 0.42 | | | | 0.17 | | | c0.36 |
| v/s Ratio Perm | | | 0.09 | | | | | | | | | |
| v/c Ratio | | 0.85 | 0.22 | 0.94 | 0.66 | | | | 0.57 | | | 1.19 |
| Uniform Delay, d1 | | 24.0 | 17.4 | 37.2 | 10.6 | | | | 26.0 | | | 30.9 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 5.4 | 0.1 | 26.7 | 0.8 | | | | 0.9 | | | 97.5 |
| Delay (s) | | 29.4 | 17.5 | 63.9 | 11.4 | | | | 26.9 | | | 128.3 |
| Level of Service | | C | B | E | B | | | | C | | | F |
| Approach Delay (s) | | 25.4 | | | 23.8 | | | 26.9 | | | 128.3 | |
| Approach LOS | | C | | | C | | | C | | | F | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 46.4 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.99 | | |
| Actuated Cycle Length (s) | 88.2 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 76.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps

2035 AM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 564 | 0 | 941 | 492 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 613 | 0 | 1023 | 535 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 118 | 0 | 0 |
| Lane Group Flow (vph) | 613 | 0 | 1023 | 417 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 25.7 | | 23.1 | 23.1 | | |
| Effective Green, g (s) | 25.7 | | 23.1 | 23.1 | | |
| Actuated g/C Ratio | 0.44 | | 0.40 | 0.40 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 720 | | 1340 | 611 | | |
| v/s Ratio Prot | c0.38 | | c0.30 | | | |
| v/s Ratio Perm | | | | 0.27 | | |
| v/c Ratio | 0.85 | | 0.76 | 0.68 | | |
| Uniform Delay, d1 | 14.3 | | 15.0 | 14.3 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 9.5 | | 2.6 | 3.1 | | |
| Delay (s) | 23.9 | | 17.6 | 17.5 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 23.9 | 17.6 | | 0.0 | |
| Approach LOS | | C | B | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 19.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.81 | | |
| Actuated Cycle Length (s) | 57.8 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 69.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↗ | ↙ | ↑↑↑ | | ↙ | ↖ | ↗ | | ↖ | ↗ |
| Volume (vph) | 174 | 854 | 415 | 136 | 1064 | 43 | 200 | 35 | 72 | 18 | 85 | 135 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4623 | | 1539 | 1565 | 1513 | | 1750 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4623 | | 1539 | 1565 | 1513 | | 1750 | 1489 |
| 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) | 189 | 928 | 451 | 148 | 1157 | 47 | 217 | 38 | 78 | 20 | 92 | 147 |
| RTOR Reduction (vph) | 0 | 0 | 257 | 0 | 4 | 0 | 0 | 0 | 64 | 0 | 0 | 136 |
| Lane Group Flow (vph) | 189 | 928 | 194 | 148 | 1200 | 0 | 126 | 129 | 14 | 0 | 112 | 11 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 17.8 | 40.8 | 40.8 | 11.4 | 34.4 | | 16.6 | 16.6 | 16.6 | | 7.0 | 7.0 |
| Effective Green, g (s) | 17.8 | 40.8 | 40.8 | 11.4 | 34.4 | | 16.6 | 16.6 | 16.6 | | 7.0 | 7.0 |
| Actuated g/C Ratio | 0.19 | 0.43 | 0.43 | 0.12 | 0.36 | | 0.17 | 0.17 | 0.17 | | 0.07 | 0.07 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 303 | 1999 | 657 | 201 | 1674 | | 268 | 273 | 264 | | 128 | 109 |
| v/s Ratio Prot | c0.12 | 0.20 | | 0.09 | c0.26 | | 0.08 | c0.08 | | | c0.06 | 0.01 |
| v/s Ratio Perm | | | 0.13 | | | | | | 0.01 | | | |
| v/c Ratio | 0.62 | 0.46 | 0.29 | 0.74 | 0.72 | | 0.47 | 0.47 | 0.05 | | 0.88 | 0.10 |
| Uniform Delay, d1 | 35.5 | 19.3 | 17.7 | 40.3 | 26.1 | | 35.2 | 35.3 | 32.6 | | 43.6 | 41.1 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.93 | 0.91 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 4.5 | 0.8 | 1.1 | 11.5 | 2.2 | | 1.8 | 1.8 | 0.1 | | 44.8 | 0.5 |
| Delay (s) | 40.0 | 20.1 | 18.8 | 48.9 | 25.8 | | 37.0 | 37.0 | 32.8 | | 88.4 | 41.6 |
| Level of Service | D | C | B | D | C | | D | D | C | | F | D |
| Approach Delay (s) | | 22.1 | | | 28.4 | | | 36.0 | | | 61.8 | |
| Approach LOS | | C | | | C | | | D | | | E | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 28.8 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.66 | C |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 57.3% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | B |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 54 | 562 | 224 | 354 | 872 | 14 | 271 | 178 | 433 | 20 | 163 | 43 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3281 | | 3143 | 3240 | 1661 | 3204 | 3124 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3281 | | 3143 | 3240 | 1661 | 3204 | 3124 | |
| 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) | 59 | 611 | 243 | 385 | 948 | 15 | 295 | 193 | 471 | 22 | 177 | 47 |
| RTOR Reduction (vph) | 0 | 0 | 186 | 0 | 1 | 0 | 0 | 0 | 330 | 0 | 28 | 0 |
| Lane Group Flow (vph) | 59 | 611 | 57 | 385 | 962 | 0 | 295 | 193 | 141 | 22 | 196 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 6.4 | 22.1 | 22.1 | 25.1 | 40.8 | | 17.0 | 28.2 | 28.2 | 1.6 | 13.2 | |
| Effective Green, g (s) | 6.4 | 22.1 | 22.1 | 25.1 | 40.8 | | 17.0 | 28.2 | 28.2 | 1.6 | 13.2 | |
| Actuated g/C Ratio | 0.07 | 0.23 | 0.23 | 0.26 | 0.43 | | 0.18 | 0.30 | 0.30 | 0.02 | 0.14 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 109 | 768 | 349 | 436 | 1409 | | 562 | 961 | 493 | 53 | 434 | |
| v/s Ratio Prot | 0.04 | c0.18 | | c0.23 | 0.29 | | c0.09 | 0.06 | | 0.01 | c0.06 | |
| v/s Ratio Perm | | | 0.04 | | | | | | 0.08 | | | |
| v/c Ratio | 0.54 | 0.80 | 0.16 | 0.88 | 0.68 | | 0.52 | 0.20 | 0.29 | 0.42 | 0.45 | |
| Uniform Delay, d1 | 42.9 | 34.3 | 29.1 | 33.5 | 21.9 | | 35.3 | 25.0 | 25.7 | 46.2 | 37.6 | |
| Progression Factor | 1.30 | 0.63 | 1.15 | 1.09 | 0.80 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.7 | 7.7 | 0.9 | 2.2 | 0.2 | | 1.2 | 0.1 | 0.4 | 7.0 | 1.0 | |
| Delay (s) | 58.4 | 29.5 | 34.2 | 38.8 | 17.7 | | 36.5 | 25.1 | 26.1 | 53.3 | 38.6 | |
| Level of Service | E | C | C | D | B | | D | C | C | D | D | |
| Approach Delay (s) | | 32.6 | | | 23.7 | | | 29.1 | | | 39.9 | |
| Approach LOS | | C | | | C | | | C | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 28.7 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.71 | | |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 64.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|-------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 431 | 244 | 325 | 5 | 429 | 69 | 409 | 1090 | 7 | 88 | 788 | 424 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1738 | 1480 | 1652 | 3535 | | 1652 | 3110 | |
| Flt Permitted | 0.16 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 273 | 1739 | 1770 | | 1732 | 1480 | 1652 | 3535 | | 1652 | 3110 | |
| 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) | 468 | 265 | 353 | 5 | 466 | 75 | 445 | 1185 | 8 | 96 | 857 | 461 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 1 | 0 | 0 | 75 | 0 |
| Lane Group Flow (vph) | 468 | 265 | 353 | 0 | 471 | 17 | 445 | 1192 | 0 | 96 | 1243 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 40.0 | 40.0 | 95.0 | | 21.5 | 21.5 | 21.0 | 32.4 | | 8.1 | 19.0 | |
| Effective Green, g (s) | 40.0 | 40.0 | 95.0 | | 21.5 | 21.5 | 21.0 | 32.4 | | 8.1 | 19.0 | |
| Actuated g/C Ratio | 0.42 | 0.42 | 1.00 | | 0.23 | 0.23 | 0.22 | 0.34 | | 0.09 | 0.20 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 325 | 732 | 1770 | | 391 | 334 | 365 | 1205 | | 140 | 622 | |
| v/s Ratio Prot | c0.22 | 0.15 | | | | | c0.27 | 0.34 | | 0.06 | c0.40 | |
| v/s Ratio Perm | c0.39 | | 0.20 | | 0.27 | 0.01 | | | | | | |
| v/c Ratio | 1.44 | 0.36 | 0.20 | | 1.20 | 0.05 | 1.22 | 0.99 | | 0.69 | 2.00 | |
| Uniform Delay, d1 | 25.8 | 18.8 | 0.0 | | 36.8 | 28.8 | 37.0 | 31.1 | | 42.2 | 38.0 | |
| Progression Factor | 0.64 | 0.62 | 1.00 | | 1.00 | 1.00 | 1.09 | 0.76 | | 0.93 | 0.94 | |
| Incremental Delay, d2 | 211.4 | 0.3 | 0.2 | | 114.0 | 0.1 | 120.5 | 23.2 | | 12.9 | 454.8 | |
| Delay (s) | 227.9 | 12.0 | 0.2 | | 150.7 | 28.9 | 161.0 | 47.0 | | 52.4 | 490.5 | |
| Level of Service | F | B | A | | F | C | F | D | | D | F | |
| Approach Delay (s) | | 101.2 | | | 134.0 | | | 77.9 | | | 460.7 | |
| Approach LOS | | F | | | F | | | E | | | F | |

| Intersection Summary | | |
|-----------------------------------|--------|-----------------------------|
| HCM 2000 Control Delay | 205.4 | HCM 2000 Level of Service F |
| HCM 2000 Volume to Capacity ratio | 1.56 | |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) 19.0 |
| Intersection Capacity Utilization | 121.2% | ICU Level of Service H |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

2035 AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 19 | 8 | 17 | 52 | 110 | 18 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 21 | 9 | 18 | 57 | 120 | 20 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 29 | 75 | 139 | | | |
| Volume Left (vph) | 21 | 18 | 0 | | | |
| Volume Right (vph) | 9 | 0 | 20 | | | |
| Hadj (s) | 0.00 | 0.08 | -0.05 | | | |
| Departure Headway (s) | 4.3 | 4.2 | 4.0 | | | |
| Degree Utilization, x | 0.04 | 0.09 | 0.15 | | | |
| Capacity (veh/h) | 785 | 839 | 889 | | | |
| Control Delay (s) | 7.5 | 7.6 | 7.7 | | | |
| Approach Delay (s) | 7.5 | 7.6 | 7.7 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.6 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 23.9% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

2035 AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 7 | 3 | 5 | 58 | 102 | 11 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 8 | 3 | 5 | 63 | 111 | 12 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 11 | 68 | 123 | | | |
| Volume Left (vph) | 8 | 5 | 0 | | | |
| Volume Right (vph) | 3 | 0 | 12 | | | |
| Hadj (s) | -0.01 | 0.05 | -0.02 | | | |
| Departure Headway (s) | 4.3 | 4.1 | 4.0 | | | |
| Degree Utilization, x | 0.01 | 0.08 | 0.14 | | | |
| Capacity (veh/h) | 798 | 862 | 899 | | | |
| Control Delay (s) | 7.4 | 7.4 | 7.6 | | | |
| Approach Delay (s) | 7.4 | 7.4 | 7.6 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.5 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 17.2% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive



















2035 AM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|------|-------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 71 | 27 | 61 | 41 | 16 | 88 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 77 | 29 | 66 | 45 | 17 | 96 |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 107 | 111 | 113 | | | |
| Volume Left (vph) | 77 | 0 | 17 | | | |
| Volume Right (vph) | 29 | 45 | 0 | | | |
| Hadj (s) | 0.01 | -0.21 | 0.06 | | | |
| Departure Headway (s) | 4.4 | 4.1 | 4.3 | | | |
| Degree Utilization, x | 0.13 | 0.13 | 0.14 | | | |
| Capacity (veh/h) | 778 | 852 | 807 | | | |
| Control Delay (s) | 8.1 | 7.6 | 8.0 | | | |
| Approach Delay (s) | 8.1 | 7.6 | 8.0 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.9 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 24.4% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2035 AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 12 | 122 | 9 | 14 | 84 | 35 | 9 | 62 | 46 | 31 | 17 | 8 |
| 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 |
| Hourly flow rate (vph) | 13 | 133 | 10 | 15 | 91 | 38 | 10 | 67 | 50 | 34 | 18 | 9 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 13 | 142 | 145 | 127 | 61 | | | | | | | |
| Volume Left (vph) | 13 | 0 | 15 | 10 | 34 | | | | | | | |
| Volume Right (vph) | 0 | 10 | 38 | 50 | 9 | | | | | | | |
| Hadj (s) | 0.53 | -0.01 | -0.10 | -0.19 | 0.06 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.1 | 4.6 | 4.5 | 4.8 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.20 | 0.18 | 0.16 | 0.08 | | | | | | | |
| Capacity (veh/h) | 616 | 678 | 747 | 744 | 684 | | | | | | | |
| Control Delay (s) | 7.5 | 8.1 | 8.6 | 8.4 | 8.3 | | | | | | | |
| Approach Delay (s) | 8.1 | | 8.6 | 8.4 | 8.3 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.3 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 34.1% | | ICU Level of Service | | A | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 83 | 83 | 33 | 47 | 81 | 226 | 32 | 525 | 48 | 141 | 350 | 35 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.99 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1689 | 1259 | 1620 | 1739 | 1316 | 1711 | 3033 | | 1620 | 3034 | |
| Flt Permitted | | 0.80 | 1.00 | 0.64 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1379 | 1259 | 1098 | 1739 | 1316 | 1711 | 3033 | | 1620 | 3034 | |
| 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) | 90 | 90 | 36 | 51 | 88 | 246 | 35 | 571 | 52 | 153 | 380 | 38 |
| RTOR Reduction (vph) | 0 | 0 | 27 | 0 | 0 | 185 | 0 | 9 | 0 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 0 | 180 | 9 | 51 | 88 | 61 | 35 | 614 | 0 | 153 | 410 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 2.6 | 19.5 | | 8.9 | 25.8 | |
| Effective Green, g (s) | | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 2.6 | 19.5 | | 8.9 | 25.8 | |
| Actuated g/C Ratio | | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.05 | 0.34 | | 0.15 | 0.45 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 339 | 310 | 270 | 428 | 324 | 77 | 1026 | | 250 | 1358 | |
| v/s Ratio Prot | | | | | 0.05 | | 0.02 | c0.20 | | c0.09 | 0.14 | |
| v/s Ratio Perm | | c0.13 | 0.01 | 0.05 | | 0.05 | | | | | | |
| v/c Ratio | | 0.53 | 0.03 | 0.19 | 0.21 | 0.19 | 0.45 | 0.60 | | 0.61 | 0.30 | |
| Uniform Delay, d1 | | 18.8 | 16.5 | 17.1 | 17.2 | 17.1 | 26.8 | 15.8 | | 22.7 | 10.1 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.6 | 0.0 | 0.3 | 0.2 | 0.3 | 4.2 | 1.1 | | 4.4 | 0.2 | |
| Delay (s) | | 20.4 | 16.5 | 17.5 | 17.5 | 17.4 | 31.0 | 16.9 | | 27.1 | 10.3 | |
| Level of Service | | C | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 19.8 | | | 17.4 | | | 17.7 | | | 14.8 | |
| Approach LOS | | B | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 17.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.58 | | |
| Actuated Cycle Length (s) | 57.6 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 55.4% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 114 | 168 | 48 | 185 | 277 | 55 | 107 | 566 | 173 | 72 | 486 | 83 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3108 | | 1593 | 3152 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3108 | | 1593 | 3152 | |
| 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) | 124 | 183 | 52 | 201 | 301 | 60 | 116 | 615 | 188 | 78 | 528 | 90 |
| RTOR Reduction (vph) | 0 | 0 | 42 | 0 | 0 | 45 | 0 | 24 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 124 | 183 | 10 | 201 | 301 | 15 | 116 | 779 | 0 | 78 | 605 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 13.4 | 22.0 | 22.0 | 18.8 | 27.4 | 27.4 | 18.6 | 41.7 | | 8.5 | 31.6 | |
| Effective Green, g (s) | 13.4 | 22.0 | 22.0 | 18.8 | 27.4 | 27.4 | 18.6 | 41.7 | | 8.5 | 31.6 | |
| Actuated g/C Ratio | 0.12 | 0.20 | 0.20 | 0.17 | 0.25 | 0.25 | 0.17 | 0.38 | | 0.08 | 0.29 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 192 | 369 | 261 | 272 | 464 | 336 | 279 | 1178 | | 123 | 905 | |
| v/s Ratio Prot | 0.08 | 0.10 | | c0.13 | c0.16 | | 0.07 | c0.25 | | 0.05 | c0.19 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.65 | 0.50 | 0.04 | 0.74 | 0.65 | 0.04 | 0.42 | 0.66 | | 0.63 | 0.67 | |
| Uniform Delay, d1 | 46.0 | 39.1 | 35.5 | 43.3 | 37.0 | 31.4 | 40.8 | 28.3 | | 49.2 | 34.6 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 0.91 | | 0.87 | 0.42 | |
| Incremental Delay, d2 | 8.1 | 1.4 | 0.1 | 10.7 | 3.5 | 0.1 | 1.3 | 2.8 | | 11.0 | 3.7 | |
| Delay (s) | 54.1 | 40.5 | 35.6 | 54.0 | 40.5 | 31.4 | 39.1 | 28.6 | | 54.0 | 18.4 | |
| Level of Service | D | D | D | D | D | C | D | C | | D | B | |
| Approach Delay (s) | | 44.5 | | | 44.3 | | | 29.9 | | | 22.4 | |
| Approach LOS | | D | | | D | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 33.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.71 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 69.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|--------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 63 | 295 | 7 | 6 | 462 | 309 | 2 | 0 | 0 | 61 | 0 | 32 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | | 1.00 |
| Frt | 1.00 | 1.00 | | | 0.94 | | | 1.00 | | 1.00 | | 0.85 |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.95 | | 0.95 | | 1.00 |
| Satd. Flow (prot) | 1770 | 1856 | | | 3327 | | | 1770 | | 1770 | | 1583 |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.95 | | 0.76 | | 1.00 |
| Satd. Flow (perm) | 1770 | 1856 | | | 3170 | | | 1770 | | 1409 | | 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) | 68 | 321 | 8 | 7 | 502 | 336 | 2 | 0 | 0 | 66 | 0 | 35 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 147 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| Lane Group Flow (vph) | 68 | 328 | 0 | 0 | 698 | 0 | 0 | 2 | 0 | 66 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | |
| Permitted Phases | | | | | | | 8 | | | 4 | | 4 |
| Actuated Green, G (s) | 2.6 | 36.1 | | | 28.6 | | | 6.8 | | 6.8 | | 6.8 |
| Effective Green, g (s) | 2.6 | 36.1 | | | 28.6 | | | 6.8 | | 6.8 | | 6.8 |
| Actuated g/C Ratio | 0.05 | 0.70 | | | 0.55 | | | 0.13 | | 0.13 | | 0.13 |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Grp Cap (vph) | 88 | 1293 | | | 1750 | | | 232 | | 184 | | 207 |
| v/s Ratio Prot | c0.04 | 0.18 | | | | | | | | | | |
| v/s Ratio Perm | | | | | c0.22 | | | 0.00 | | c0.05 | | 0.00 |
| v/c Ratio | 0.77 | 0.25 | | | 1.02dr | | | 0.01 | | 0.36 | | 0.02 |
| Uniform Delay, d1 | 24.3 | 2.9 | | | 6.7 | | | 19.6 | | 20.5 | | 19.6 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | | 1.00 |
| Incremental Delay, d2 | 31.0 | 0.1 | | | 0.2 | | | 0.0 | | 1.6 | | 0.1 |
| Delay (s) | 55.3 | 3.0 | | | 6.9 | | | 19.6 | | 22.1 | | 19.7 |
| Level of Service | E | A | | | A | | | B | | C | | B |
| Approach Delay (s) | | 12.0 | | | 6.9 | | | 19.6 | | | 21.3 | |
| Approach LOS | | B | | | A | | | B | | | C | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 9.5 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.42 | | |
| Actuated Cycle Length (s) | 51.8 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 53.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 26: Miller St & Fairway Dr/Aladdin Ave

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 63 | 312 | 31 | 78 | 829 | 310 | 12 | 1 | 12 | 61 | 3 | 32 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.96 | | 1.00 | 0.86 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1833 | | 1593 | 1906 | | 1711 | 1550 | | 1770 | 1605 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1833 | | 1593 | 1906 | | 1801 | 1550 | | 1770 | 1605 | |
| 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) | 68 | 339 | 34 | 85 | 901 | 337 | 13 | 1 | 13 | 66 | 3 | 35 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 12 | 0 | 0 | 29 | 0 |
| Lane Group Flow (vph) | 68 | 371 | 0 | 85 | 1230 | 0 | 13 | 2 | 0 | 66 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 4.4 | 38.6 | | 7.2 | 41.4 | | 3.1 | 3.1 | | 4.4 | 11.5 | |
| Effective Green, g (s) | 4.4 | 38.6 | | 7.2 | 41.4 | | 3.1 | 3.1 | | 4.4 | 11.5 | |
| Actuated g/C Ratio | 0.06 | 0.54 | | 0.10 | 0.58 | | 0.04 | 0.04 | | 0.06 | 0.16 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 109 | 995 | | 161 | 1109 | | 78 | 67 | | 109 | 259 | |
| v/s Ratio Prot | 0.04 | 0.20 | | c0.05 | c0.65 | | | 0.00 | | c0.04 | 0.01 | |
| v/s Ratio Perm | | | | | | | c0.01 | | | | | |
| v/c Ratio | 0.62 | 0.37 | | 0.53 | 1.11 | | 0.17 | 0.02 | | 0.61 | 0.03 | |
| Uniform Delay, d1 | 32.5 | 9.3 | | 30.3 | 14.8 | | 32.8 | 32.6 | | 32.5 | 25.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.8 | 0.3 | | 1.4 | 62.0 | | 1.4 | 0.2 | | 6.4 | 0.1 | |
| Delay (s) | 40.3 | 9.6 | | 31.8 | 76.9 | | 34.1 | 32.7 | | 38.9 | 25.2 | |
| Level of Service | D | A | | C | E | | C | C | | D | C | |
| Approach Delay (s) | | 14.4 | | | 74.0 | | | 33.4 | | | 33.9 | |
| Approach LOS | | B | | | E | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 57.3 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.99 | | |
| Actuated Cycle Length (s) | 71.1 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 82.3% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Teagarden St & Aladdin Ave

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|-------|------|-------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 43 | 279 | 59 | 13 | 780 | 40 | 142 | 111 | 11 | 75 | 152 | 216 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 0.91 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1970 | | 1711 | 1708 | | 1652 | 1833 | | 1644 | 1733 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.34 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1970 | | 1711 | 1708 | | 598 | 1833 | | 1162 | 1733 | |
| 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) | 47 | 303 | 64 | 14 | 848 | 43 | 154 | 121 | 12 | 82 | 165 | 235 |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 68 | 0 |
| Lane Group Flow (vph) | 47 | 357 | 0 | 14 | 889 | 0 | 154 | 128 | 0 | 82 | 332 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 5.1 | 27.6 | | 1.4 | 23.9 | | 21.6 | 21.6 | | 21.6 | 21.6 | |
| Effective Green, g (s) | 5.1 | 27.6 | | 1.4 | 23.9 | | 21.6 | 21.6 | | 21.6 | 21.6 | |
| Actuated g/C Ratio | 0.08 | 0.43 | | 0.02 | 0.38 | | 0.34 | 0.34 | | 0.34 | 0.34 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 137 | 854 | | 37 | 641 | | 203 | 622 | | 394 | 588 | |
| v/s Ratio Prot | c0.03 | c0.18 | | 0.01 | c0.52 | | | 0.07 | | | 0.19 | |
| v/s Ratio Perm | | | | | | | c0.26 | | | 0.07 | | |
| v/c Ratio | 0.34 | 0.42 | | 0.38 | 1.39 | | 0.76 | 0.21 | | 0.21 | 0.56 | |
| Uniform Delay, d1 | 27.7 | 12.4 | | 30.7 | 19.9 | | 18.7 | 14.9 | | 14.9 | 17.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.0 | 0.5 | | 8.6 | 183.3 | | 15.8 | 0.2 | | 0.4 | 1.5 | |
| Delay (s) | 29.7 | 12.9 | | 39.3 | 203.2 | | 34.5 | 15.1 | | 15.3 | 18.7 | |
| Level of Service | C | B | | D | F | | C | B | | B | B | |
| Approach Delay (s) | | 14.8 | | | 200.6 | | | 25.5 | | | 18.1 | |
| Approach LOS | | B | | | F | | | C | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 97.6 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.01 | | |
| Actuated Cycle Length (s) | 63.6 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 83.9% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 204 | 17 | 89 | 2 | 12 | 10 | 569 | 765 | 15 | 7 | 341 | 282 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.87 | | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1541 | | 1652 | 1603 | | 1652 | 3240 | 1441 | 1711 | 3155 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1541 | | 1652 | 1603 | | 1652 | 3240 | 1441 | 1711 | 3155 | |
| 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) | 222 | 18 | 97 | 2 | 13 | 11 | 618 | 832 | 16 | 8 | 371 | 307 |
| RTOR Reduction (vph) | 0 | 73 | 0 | 0 | 10 | 0 | 0 | 0 | 7 | 0 | 118 | 0 |
| Lane Group Flow (vph) | 222 | 42 | 0 | 2 | 14 | 0 | 618 | 832 | 9 | 8 | 560 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 13.1 | 26.9 | | 0.7 | 14.5 | | 39.2 | 64.9 | 64.9 | 0.7 | 26.4 | |
| Effective Green, g (s) | 13.1 | 26.9 | | 0.7 | 14.5 | | 39.2 | 64.9 | 64.9 | 0.7 | 26.4 | |
| Actuated g/C Ratio | 0.12 | 0.25 | | 0.01 | 0.13 | | 0.36 | 0.59 | 0.59 | 0.01 | 0.24 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 197 | 377 | | 10 | 211 | | 590 | 1916 | 852 | 10 | 759 | |
| v/s Ratio Prot | c0.13 | c0.03 | | 0.00 | 0.01 | | c0.37 | 0.26 | | 0.00 | c0.18 | |
| v/s Ratio Perm | | | | | | | | | 0.01 | | | |
| v/c Ratio | 1.13 | 0.11 | | 0.20 | 0.07 | | 1.05 | 0.43 | 0.01 | 0.80 | 0.74 | |
| Uniform Delay, d1 | 48.3 | 32.1 | | 54.2 | 41.7 | | 35.2 | 12.3 | 9.2 | 54.4 | 38.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 102.4 | 0.3 | | 19.6 | 0.3 | | 50.1 | 0.3 | 0.0 | 184.3 | 4.5 | |
| Delay (s) | 150.7 | 32.4 | | 73.9 | 42.0 | | 85.3 | 12.6 | 9.2 | 238.7 | 43.0 | |
| Level of Service | F | C | | E | D | | F | B | A | F | D | |
| Approach Delay (s) | | 110.3 | | | 44.4 | | | 43.2 | | | 45.3 | |
| Approach LOS | | F | | | D | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 52.8 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.83 | | |
| Actuated Cycle Length (s) | 109.7 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 78.7% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↗ | ↖ | ↕↕↕ | | ↖ | ↕↕ | |
| Volume (vph) | 3 | 2 | 0 | 5 | 0 | 15 | 4 | 902 | 7 | 46 | 1249 | 5 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1808 | | | 1562 | 1397 | 1650 | 4947 | | 1617 | 3469 | |
| Flt Permitted | | 0.86 | | | 0.75 | 1.00 | 0.19 | 1.00 | | 0.28 | 1.00 | |
| Satd. Flow (perm) | | 1606 | | | 1241 | 1397 | 325 | 4947 | | 473 | 3469 | |
| 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) | 3 | 2 | 0 | 5 | 0 | 16 | 4 | 980 | 8 | 50 | 1358 | 5 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 5 | 0 | 0 | 5 | 1 | 4 | 988 | 0 | 50 | 1363 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Effective Green, g (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | 0.06 | 0.86 | 0.86 | | 0.86 | 0.86 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 103 | | | 80 | 90 | 278 | 4240 | | 405 | 2973 | |
| v/s Ratio Prot | | | | | | | | 0.20 | | | c0.39 | |
| v/s Ratio Perm | | 0.00 | | | c0.00 | 0.00 | 0.01 | | | 0.11 | | |
| v/c Ratio | | 0.05 | | | 0.06 | 0.01 | 0.01 | 0.23 | | 0.12 | 0.46 | |
| Uniform Delay, d1 | | 48.3 | | | 48.3 | 48.2 | 1.1 | 1.4 | | 1.3 | 1.8 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.44 | 0.34 | | 0.05 | 0.52 | |
| Incremental Delay, d2 | | 0.2 | | | 0.3 | 0.1 | 0.1 | 0.1 | | 0.1 | 0.0 | |
| Delay (s) | | 48.5 | | | 48.7 | 48.2 | 0.6 | 0.6 | | 0.1 | 1.0 | |
| Level of Service | | D | | | D | D | A | A | | A | A | |
| Approach Delay (s) | | 48.5 | | | 48.3 | | | 0.6 | | | 1.0 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 1.3 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.43 | A |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 50.2% | 8.6 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 30: Merced Street & Republic Ave

2035 AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|-------|------|------|-------|------|-------|------|---------------------------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕↕ | ↕ | ↕↕ | ↕ | ↕↕ | ↕↕ | ↕↕ | |
| Volume (vph) | 32 | 2 | 8 | 38 | 6 | 256 | 9 | 769 | 55 | 487 | 903 | 7 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | |
| Flt Protected | | 0.96 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1707 | | | 1786 | 2787 | 1736 | 3471 | 1583 | 3433 | 3466 | | |
| Flt Permitted | | 0.75 | | | 0.79 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1322 | | | 1476 | 2787 | 1736 | 3471 | 1583 | 3433 | 3466 | | |
| 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) | 35 | 2 | 9 | 41 | 7 | 278 | 10 | 836 | 60 | 529 | 982 | 8 | |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 0 | 254 | 0 | 0 | 34 | 0 | 0 | 0 | |
| Lane Group Flow (vph) | 0 | 38 | 0 | 0 | 48 | 24 | 10 | 836 | 26 | 529 | 990 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | |
| Actuated Green, G (s) | | 9.3 | | | 9.3 | 9.3 | 1.5 | 47.1 | 47.1 | 40.1 | 85.7 | | |
| Effective Green, g (s) | | 9.3 | | | 9.3 | 9.3 | 1.5 | 47.1 | 47.1 | 40.1 | 85.7 | | |
| Actuated g/C Ratio | | 0.08 | | | 0.08 | 0.08 | 0.01 | 0.43 | 0.43 | 0.36 | 0.78 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | | 111 | | | 124 | 235 | 23 | 1486 | 677 | 1251 | 2700 | | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.24 | | c0.15 | 0.29 | | |
| v/s Ratio Perm | | 0.03 | | | c0.03 | 0.01 | | | 0.02 | | | | |
| v/c Ratio | | 0.34 | | | 0.39 | 0.10 | 0.43 | 0.56 | 0.04 | 0.42 | 0.37 | | |
| Uniform Delay, d1 | | 47.5 | | | 47.7 | 46.5 | 53.8 | 23.7 | 18.3 | 26.3 | 3.8 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.26 | 0.35 | 0.05 | 0.27 | 0.14 | | |
| Incremental Delay, d2 | | 1.8 | | | 2.0 | 0.2 | 10.9 | 1.3 | 0.1 | 0.2 | 0.4 | | |
| Delay (s) | | 49.3 | | | 49.7 | 46.7 | 78.7 | 9.7 | 1.0 | 7.2 | 0.9 | | |
| Level of Service | | D | | | D | D | E | A | A | A | A | | |
| Approach Delay (s) | | 49.3 | | | 47.1 | | | 9.9 | | | 3.1 | | |
| Approach LOS | | D | | | D | | | A | | | A | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 11.2 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.49 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 55.4% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

2035 AM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 15 | 4 | 30 | 824 | 653 | 51 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3203 | |
| Flt Permitted | 0.95 | 1.00 | 0.36 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 629 | 3240 | 3203 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 16 | 4 | 33 | 896 | 710 | 55 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 16 | 0 | 33 | 896 | 759 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Effective Green, g (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Actuated g/C Ratio | 0.08 | 0.08 | 0.76 | 0.76 | 0.76 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 129 | 103 | 476 | 2456 | 2428 | |
| v/s Ratio Prot | c0.01 | | | c0.28 | 0.24 | |
| v/s Ratio Perm | | 0.00 | 0.05 | | | |
| v/c Ratio | 0.12 | 0.00 | 0.07 | 0.36 | 0.31 | |
| Uniform Delay, d1 | 23.6 | 23.4 | 1.7 | 2.2 | 2.1 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.13 | |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.3 | 0.4 | 0.3 | |
| Delay (s) | 24.0 | 23.4 | 2.0 | 2.6 | 0.5 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.6 | 0.5 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 1.9 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.34 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2035 PM

HCM Signalized Intersection Capacity Analysis

2035 PM

1: Doolittle Dr & Davis St

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|---------------------|------|-------|------|------|-------|------|------|-------|-------|------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 44 | 95 | 21 | 140 | 77 | 659 | 12 | 392 | 618 | 805 | 741 | 20 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3102 | | 3255 | 1689 | 1492 | 1620 | 4655 | 1437 | 3143 | 3225 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3102 | | 3255 | 1689 | 1492 | 1620 | 4655 | 1437 | 3143 | 3225 | | |
| 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) | 48 | 103 | 23 | 152 | 84 | 716 | 13 | 426 | 672 | 875 | 805 | 22 | |
| RTOR Reduction (vph) | 0 | 20 | 0 | 0 | 0 | 144 | 0 | 0 | 217 | 0 | 1 | 0 | |
| Lane Group Flow (vph) | 48 | 106 | 0 | 152 | 84 | 572 | 13 | 426 | 455 | 875 | 826 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 4.7 | 13.3 | | 15.0 | 23.6 | 51.2 | 4.6 | 19.5 | 34.5 | 27.6 | 42.5 | | |
| Effective Green, g (s) | 4.7 | 13.3 | | 15.0 | 23.6 | 51.2 | 4.6 | 19.5 | 34.5 | 27.6 | 42.5 | | |
| Actuated g/C Ratio | 0.05 | 0.15 | | 0.17 | 0.26 | 0.56 | 0.05 | 0.21 | 0.38 | 0.30 | 0.47 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 86 | 454 | | 538 | 439 | 842 | 82 | 1000 | 546 | 956 | 1511 | | |
| v/s Ratio Prot | 0.03 | 0.03 | | 0.05 | 0.05 | c0.21 | 0.01 | 0.09 | c0.14 | c0.28 | 0.26 | | |
| v/s Ratio Perm | | | | | | 0.18 | | | 0.18 | | | | |
| v/c Ratio | 0.56 | 0.23 | | 0.28 | 0.19 | 0.68 | 0.16 | 0.43 | 0.83 | 0.92 | 0.55 | | |
| Uniform Delay, d1 | 42.0 | 34.2 | | 33.1 | 26.1 | 14.0 | 41.2 | 30.8 | 25.5 | 30.4 | 17.2 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 4.4 | 0.3 | | 0.1 | 0.2 | 1.7 | 0.3 | 0.4 | 10.1 | 12.8 | 0.6 | | |
| Delay (s) | 46.4 | 34.5 | | 33.2 | 26.3 | 15.7 | 41.5 | 31.2 | 35.6 | 43.2 | 17.8 | | |
| Level of Service | D | C | | C | C | B | D | C | D | D | B | | |
| Approach Delay (s) | | 37.8 | | | 19.4 | | | 34.0 | | | 30.9 | | |
| Approach LOS | | D | | | B | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 29.3 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.86 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 90.7 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 74.8% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

2035 PM

2: Phillips Ln & Davis St



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|-------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↗ | ↖ | ↗ | | ↖ | ↗ | ↖ |
| Volume (vph) | 137 | 1451 | 24 | 23 | 709 | 429 | 53 | 13 | 274 | 455 | 3 | 128 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.86 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3170 | | 1620 | 3023 | 1328 | 1678 | 1442 | | 3143 | 1416 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.23 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3170 | | 1620 | 3023 | 1328 | 411 | 1442 | | 3143 | 1416 | |
| 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) | 149 | 1577 | 26 | 25 | 771 | 466 | 58 | 14 | 298 | 495 | 3 | 139 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 7 | 160 | 0 | 185 | 0 | 0 | 105 | 0 |
| Lane Group Flow (vph) | 149 | 1602 | 0 | 25 | 857 | 213 | 58 | 127 | 0 | 495 | 37 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 14.9 | 44.5 | | 4.5 | 34.1 | 59.9 | 17.2 | 17.2 | | 25.8 | 25.8 | |
| Effective Green, g (s) | 14.9 | 44.5 | | 4.5 | 34.1 | 59.9 | 17.2 | 17.2 | | 25.8 | 25.8 | |
| Actuated g/C Ratio | 0.14 | 0.42 | | 0.04 | 0.32 | 0.57 | 0.16 | 0.16 | | 0.25 | 0.25 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 229 | 1343 | | 69 | 981 | 757 | 67 | 236 | | 772 | 347 | |
| v/s Ratio Prot | c0.09 | c0.51 | | 0.02 | 0.28 | 0.07 | | 0.09 | | c0.16 | | |
| v/s Ratio Perm | | | | | | 0.09 | c0.14 | | | | | 0.03 |
| v/c Ratio | 0.65 | 1.19 | | 0.36 | 0.87 | 0.28 | 0.87 | 0.54 | | 0.64 | 0.11 | |
| Uniform Delay, d1 | 42.6 | 30.2 | | 48.9 | 33.4 | 11.5 | 42.8 | 40.3 | | 35.5 | 30.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.48 | 0.71 | 2.56 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.0 | 94.4 | | 1.1 | 9.7 | 0.2 | 63.3 | 1.2 | | 1.8 | 0.1 | |
| Delay (s) | 47.6 | 124.6 | | 73.3 | 33.4 | 29.7 | 106.0 | 41.5 | | 37.3 | 30.8 | |
| Level of Service | D | F | | E | C | C | F | D | | D | C | |
| Approach Delay (s) | | 118.1 | | | 33.1 | | | 51.6 | | | 35.8 | |
| Approach LOS | | F | | | C | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 72.2 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.95 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 96.5% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↵ | ↑↑↑ | | ↵↵ | ↑↑↑ | | | ↑ | ↵↵ | ↵ | ↑ | |
| Volume (vph) | 24 | 1893 | 229 | 345 | 1005 | 97 | 152 | 23 | 490 | 65 | 22 | 26 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.91 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4495 | | 3143 | 4705 | | | 1809 | 2805 | 1562 | 1468 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.72 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4495 | | 3143 | 4705 | | | 1354 | 2805 | 1562 | 1468 | |
| 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) | 26 | 2058 | 249 | 375 | 1092 | 105 | 165 | 25 | 533 | 71 | 24 | 28 |
| RTOR Reduction (vph) | 0 | 13 | 0 | 0 | 8 | 0 | 0 | 0 | 145 | 0 | 25 | 0 |
| Lane Group Flow (vph) | 26 | 2294 | 0 | 375 | 1189 | 0 | 0 | 190 | 388 | 71 | 27 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 5.6 | 47.6 | | 15.9 | 58.4 | | | 18.4 | 34.3 | 9.6 | 9.6 | |
| Effective Green, g (s) | 5.6 | 47.6 | | 15.9 | 58.4 | | | 18.4 | 34.3 | 9.6 | 9.6 | |
| Actuated g/C Ratio | 0.05 | 0.45 | | 0.15 | 0.56 | | | 0.18 | 0.33 | 0.09 | 0.09 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 86 | 2037 | | 475 | 2616 | | | 237 | 916 | 142 | 134 | |
| v/s Ratio Prot | 0.02 | c0.51 | | c0.12 | 0.25 | | | | 0.06 | c0.05 | 0.02 | |
| v/s Ratio Perm | | | | | | | | c0.14 | 0.07 | | | |
| v/c Ratio | 0.30 | 1.13 | | 0.79 | 0.45 | | | 0.80 | 0.42 | 0.50 | 0.20 | |
| Uniform Delay, d1 | 47.8 | 28.7 | | 42.9 | 13.8 | | | 41.5 | 27.6 | 45.4 | 44.1 | |
| Progression Factor | 0.84 | 1.01 | | 1.24 | 1.07 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.2 | 59.1 | | 4.9 | 0.3 | | | 16.6 | 0.1 | 1.0 | 0.3 | |
| Delay (s) | 40.5 | 88.0 | | 58.0 | 15.2 | | | 58.1 | 27.7 | 46.4 | 44.4 | |
| Level of Service | D | F | | E | B | | | E | C | D | D | |
| Approach Delay (s) | | 87.5 | | | 25.4 | | | 35.7 | | | 45.6 | |
| Approach LOS | | F | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 58.0 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.94 | E |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 79.7% | 13.5 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | D |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: I-880 SB ramps & Davis St/Davis Street

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|--------|------|------|------|------|------|------|-------|------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 1552 | 825 | 0 | 1091 | 446 | 0 | 0 | 0 | 349 | 0 | 421 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.96 | | | | | 1.00 | 0.90 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3095 | | | | | 1681 | 1470 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.98 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3095 | | | | | 1681 | 1470 | 1461 |
| 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 | 1687 | 897 | 0 | 1186 | 485 | 0 | 0 | 0 | 379 | 0 | 458 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 27 | 27 |
| Lane Group Flow (vph) | 0 | 1687 | 897 | 0 | 1636 | 0 | 0 | 0 | 0 | 288 | 252 | 243 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 60.7 | 105.0 | | 60.7 | | | | | 36.3 | 36.3 | 36.3 |
| Effective Green, g (s) | | 60.7 | 105.0 | | 60.7 | | | | | 36.3 | 36.3 | 36.3 |
| Actuated g/C Ratio | | 0.58 | 1.00 | | 0.58 | | | | | 0.35 | 0.35 | 0.35 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1903 | 1439 | | 1789 | | | | | 581 | 508 | 505 |
| v/s Ratio Prot | | 0.51 | | | 0.53 | | | | | 0.17 | 0.17 | 0.17 |
| v/s Ratio Perm | | | 0.62 | | | | | | | | | |
| v/c Ratio | | 0.89 | 0.62 | | 0.91 | | | | | 0.50 | 0.50 | 0.48 |
| Uniform Delay, d1 | | 19.2 | 0.0 | | 19.8 | | | | | 27.1 | 27.1 | 27.0 |
| Progression Factor | | 0.59 | 1.00 | | 0.72 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 2.0 | 0.2 | | 7.9 | | | | | 0.7 | 0.8 | 0.7 |
| Delay (s) | | 13.4 | 0.2 | | 22.2 | | | | | 27.8 | 27.9 | 27.7 |
| Level of Service | | B | A | | C | | | | | C | C | C |
| Approach Delay (s) | | 8.8 | | | 22.2 | | | 0.0 | | | 27.8 | |
| Approach LOS | | A | | | C | | | A | | | C | |

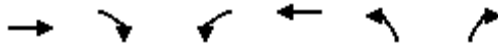
Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 16.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.83 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 72.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

2035 PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↘↘ | ↗ |
| Volume (vph) | 1116 | 700 | 0 | 1074 | 420 | 539 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Fr _t | 0.94 | | | 1.00 | 0.95 | 0.85 |
| Fl _t Protected | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3335 | | | 3539 | 3314 | 1441 |
| Fl _t Permitted | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3335 | | | 3539 | 3314 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1213 | 761 | 0 | 1167 | 457 | 586 |
| RTOR Reduction (vph) | 67 | 0 | 0 | 0 | 38 | 38 |
| Lane Group Flow (vph) | 1907 | 0 | 0 | 1167 | 671 | 296 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 70.2 | | | 70.2 | 27.8 | 27.8 |
| Effective Green, g (s) | 70.2 | | | 70.2 | 27.8 | 27.8 |
| Actuated g/C Ratio | 0.67 | | | 0.67 | 0.26 | 0.26 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2229 | | | 2366 | 877 | 381 |
| v/s Ratio Prot | c0.57 | | | 0.33 | 0.20 | c0.21 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.86 | | | 0.49 | 0.76 | 0.78 |
| Uniform Delay, d ₁ | 13.5 | | | 8.6 | 35.6 | 35.7 |
| Progression Factor | 0.40 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d ₂ | 2.7 | | | 0.7 | 3.6 | 8.7 |
| Delay (s) | 8.0 | | | 9.3 | 39.2 | 44.5 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 8.0 | | | 9.3 | 40.9 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 16.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.83 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 82.2% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
6: Doolittle Dr & Williams St

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↕ | | ↕ | ↕↕ | |
| Volume (vph) | 53 | 82 | 22 | 98 | 72 | 83 | 16 | 773 | 71 | 166 | 819 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.99 | |
| Flt Protected | | 0.98 | | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1524 | | | 1682 | 1301 | 1620 | 3033 | | 1562 | 3044 | |
| Flt Permitted | | 0.82 | | | 0.70 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1279 | | | 1215 | 1301 | 1620 | 3033 | | 1562 | 3044 | |
| 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) | 58 | 89 | 24 | 107 | 78 | 90 | 17 | 840 | 77 | 180 | 890 | 57 |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 70 | 0 | 8 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 0 | 164 | 0 | 0 | 185 | 20 | 17 | 909 | 0 | 180 | 943 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | | 14 | 5 | | 2 | 2 | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | | 5 | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | |
| Actuated Green, G (s) | | 16.6 | | | 16.6 | 16.6 | 1.5 | 29.7 | | 14.3 | 42.0 | |
| Effective Green, g (s) | | 16.6 | | | 16.6 | 16.6 | 1.5 | 29.7 | | 14.3 | 42.0 | |
| Actuated g/C Ratio | | 0.22 | | | 0.22 | 0.22 | 0.02 | 0.40 | | 0.19 | 0.57 | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | | 287 | | | 273 | 292 | 32 | 1220 | | 302 | 1732 | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.30 | | c0.12 | 0.31 | |
| v/s Ratio Perm | | 0.13 | | | c0.15 | 0.02 | | | | | | |
| v/c Ratio | | 0.57 | | | 0.68 | 0.07 | 0.53 | 0.75 | | 0.60 | 0.54 | |
| Uniform Delay, d1 | | 25.4 | | | 26.2 | 22.5 | 35.8 | 18.8 | | 27.1 | 9.9 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 3.3 | | | 7.1 | 0.1 | 19.9 | 2.7 | | 3.7 | 0.4 | |
| Delay (s) | | 28.7 | | | 33.3 | 22.7 | 55.7 | 21.5 | | 30.8 | 10.4 | |
| Level of Service | | C | | | C | C | E | C | | C | B | |
| Approach Delay (s) | | 28.7 | | | 29.8 | | | 22.1 | | | 13.6 | |
| Approach LOS | | C | | | C | | | C | | | B | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 19.6 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.70 | B |
| Actuated Cycle Length (s) | 73.8 | Sum of lost time (s) |
| Intersection Capacity Utilization | 61.1% | 13.7 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | B |
| c Critical Lane Group | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

2035 PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 51 | 433 | 226 | 323 | 265 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1556 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1556 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 55 | 471 | 246 | 351 | 288 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 145 | 0 | 32 |
| Lane Group Flow (vph) | 55 | 471 | 246 | 206 | 288 | 25 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 7.2 | 75.8 | 64.6 | 64.6 | 25.6 | 25.6 |
| Effective Green, g (s) | 7.2 | 75.8 | 64.6 | 64.6 | 25.6 | 25.6 |
| Actuated g/C Ratio | 0.07 | 0.69 | 0.59 | 0.59 | 0.23 | 0.23 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 106 | 1258 | 1001 | 913 | 363 | 313 |
| v/s Ratio Prot | c0.03 | c0.26 | 0.14 | | c0.18 | |
| v/s Ratio Perm | | | | 0.13 | | 0.02 |
| v/c Ratio | 0.52 | 0.37 | 0.25 | 0.23 | 0.79 | 0.08 |
| Uniform Delay, d1 | 49.7 | 7.2 | 10.9 | 10.8 | 39.7 | 33.0 |
| Progression Factor | 1.00 | 1.00 | 1.58 | 4.73 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.8 | 0.9 | 0.5 | 0.5 | 11.3 | 0.1 |
| Delay (s) | 51.5 | 8.0 | 17.8 | 51.6 | 51.0 | 33.1 |
| Level of Service | D | A | B | D | D | C |
| Approach Delay (s) | | 12.6 | 37.7 | | 48.1 | |
| Approach LOS | | B | D | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 31.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.50 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 46.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

2035 PM

8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBL | EBT | EBR | WBL | WBT | NBL2 | NBL | NBR | SBL | SBT | SEL | SER |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|
| Lane Configurations | | ↑ | ↗ | ↖ | ↗ | | ↘ | ↗ | | ↕ | ↘ | ↘ |
| Volume (vph) | 2 | 294 | 400 | 127 | 212 | 274 | 8 | 177 | 1 | 8 | 1 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 9 | 10 | 11 | 11 | 16 | 12 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.97 | | 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 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.85 | | 1.00 | 0.88 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | 1759 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | 1757 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| 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) | 2 | 320 | 435 | 138 | 230 | 298 | 9 | 192 | 1 | 9 | 1 | 9 |
| RTOR Reduction (vph) | 0 | 0 | 252 | 0 | 0 | 0 | 0 | 105 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 322 | 183 | 138 | 230 | 0 | 307 | 87 | 0 | 10 | 10 | 0 |
| Confl. Peds. (#/hr) | | | 14 | | | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | 7 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Turn Type | Perm | NA | Perm | Prot | NA | Prot | Prot | Perm | Split | NA | Prot | |
| Protected Phases | | 2 | | 1 | 6 | 4 | 4 | | 8 | 8 | 7 | |
| Permitted Phases | 2 | | 2 | | | | | 4 | | | | |
| Actuated Green, G (s) | | 46.3 | 46.3 | 14.8 | 65.1 | | 24.5 | 24.5 | | 1.4 | 2.4 | |
| Effective Green, g (s) | | 46.3 | 46.3 | 14.8 | 65.1 | | 24.5 | 24.5 | | 1.4 | 2.4 | |
| Actuated g/C Ratio | | 0.42 | 0.42 | 0.13 | 0.59 | | 0.22 | 0.22 | | 0.01 | 0.02 | |
| Clearance Time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 739 | 606 | 210 | 1009 | | 373 | 380 | | 23 | 34 | |
| v/s Ratio Prot | | | | c0.09 | 0.13 | | c0.18 | | | c0.01 | c0.01 | |
| v/s Ratio Perm | | c0.18 | 0.13 | | | | | 0.05 | | | | |
| v/c Ratio | | 0.44 | 0.30 | 0.66 | 0.23 | | 0.82 | 0.23 | | 0.43 | 0.29 | |
| Uniform Delay, d1 | | 22.6 | 21.1 | 45.2 | 10.6 | | 40.7 | 35.0 | | 53.9 | 53.0 | |
| Progression Factor | | 0.83 | 1.30 | 1.00 | 1.00 | | 0.71 | 0.34 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.6 | 1.1 | 7.2 | 0.5 | | 13.2 | 0.3 | | 12.6 | 4.8 | |
| Delay (s) | | 20.4 | 28.6 | 52.4 | 11.1 | | 41.9 | 12.2 | | 66.5 | 57.7 | |
| Level of Service | | C | C | D | B | | D | B | | E | E | |
| Approach Delay (s) | | 25.1 | | | 26.6 | | | | | 66.5 | 57.7 | |
| Approach LOS | | C | | | C | | | | | E | E | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 27.5 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.57 | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) 20.6 |
| Intersection Capacity Utilization | 81.1% | ICU Level of Service D |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

2035 PM



















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | ↑ | ↗ | ↘ | |
| Volume (veh/h) | 0 | 172 | 249 | 13 | 21 | 0 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 187 | 271 | 14 | 23 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 285 | | | | 458 | 271 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 285 | | | | 458 | 271 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 96 | 100 |
| cM capacity (veh/h) | 1277 | | | | 561 | 768 |

| Direction, Lane # | EB 1 | WB 1 | WB 2 | SB 1 |
|------------------------|------|------|------|------|
| Volume Total | 187 | 271 | 14 | 23 |
| Volume Left | 0 | 0 | 0 | 23 |
| Volume Right | 0 | 0 | 14 | 0 |
| cSH | 1700 | 1700 | 1700 | 561 |
| Volume to Capacity | 0.11 | 0.16 | 0.01 | 0.04 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 3 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 11.7 |
| Lane LOS | | | | B |
| Approach Delay (s) | 0.0 | 0.0 | | 11.7 |
| Approach LOS | | | | B |

| Intersection Summary | | | |
|-----------------------------------|--|-------|------------------------|
| Average Delay | | 0.5 | |
| Intersection Capacity Utilization | | 23.1% | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2035 PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 29 | 168 | 12 | 44 | 208 | 51 | 14 | 42 | 33 | 26 | 38 | 20 |
| 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 |
| Hourly flow rate (vph) | 32 | 183 | 13 | 48 | 226 | 55 | 15 | 46 | 36 | 28 | 41 | 22 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 227 | 329 | 97 | 91 | | | | | | | | |
| Volume Left (vph) | 32 | 48 | 15 | 28 | | | | | | | | |
| Volume Right (vph) | 13 | 55 | 36 | 22 | | | | | | | | |
| Hadj (s) | 0.03 | -0.04 | -0.16 | -0.05 | | | | | | | | |
| Departure Headway (s) | 4.8 | 4.7 | 5.2 | 5.3 | | | | | | | | |
| Degree Utilization, x | 0.31 | 0.43 | 0.14 | 0.14 | | | | | | | | |
| Capacity (veh/h) | 698 | 737 | 603 | 596 | | | | | | | | |
| Control Delay (s) | 10.0 | 11.1 | 9.1 | 9.2 | | | | | | | | |
| Approach Delay (s) | 10.0 | 11.1 | 9.1 | 9.2 | | | | | | | | |
| Approach LOS | A | B | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.3 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 37.4% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

2035 PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 58 | 170 | 30 | 229 | 250 | 264 | 16 | 559 | 217 | 262 | 686 | 90 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 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 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1446 | 1620 | 1739 | 1393 | 1652 | 3240 | 1331 | 1620 | 3021 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1446 | 1620 | 1739 | 1393 | 1652 | 3240 | 1331 | 1620 | 3021 | |
| 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) | 63 | 185 | 33 | 249 | 272 | 287 | 17 | 608 | 236 | 285 | 746 | 98 |
| RTOR Reduction (vph) | 0 | 0 | 27 | 0 | 0 | 206 | 0 | 0 | 99 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 63 | 185 | 6 | 249 | 272 | 81 | 17 | 608 | 137 | 285 | 838 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 9.1 | 19.7 | 19.7 | 22.6 | 33.2 | 33.2 | 3.1 | 30.7 | 30.7 | 26.3 | 53.9 | |
| Effective Green, g (s) | 9.1 | 19.7 | 19.7 | 22.6 | 33.2 | 33.2 | 3.1 | 30.7 | 30.7 | 26.3 | 53.9 | |
| Actuated g/C Ratio | 0.08 | 0.17 | 0.17 | 0.19 | 0.28 | 0.28 | 0.03 | 0.26 | 0.26 | 0.22 | 0.46 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 128 | 292 | 242 | 312 | 492 | 394 | 43 | 847 | 348 | 363 | 1388 | |
| v/s Ratio Prot | 0.04 | c0.11 | | c0.15 | 0.16 | | 0.01 | c0.19 | | c0.18 | 0.28 | |
| v/s Ratio Perm | | | 0.00 | | | 0.06 | | | 0.10 | | | |
| v/c Ratio | 0.49 | 0.63 | 0.02 | 0.80 | 0.55 | 0.21 | 0.40 | 0.72 | 0.39 | 0.79 | 0.60 | |
| Uniform Delay, d1 | 51.9 | 45.4 | 40.8 | 45.2 | 35.7 | 32.0 | 56.2 | 39.4 | 35.6 | 42.8 | 23.7 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.0 | 5.0 | 0.1 | 14.0 | 1.7 | 0.4 | 8.0 | 3.1 | 1.0 | 11.2 | 0.9 | |
| Delay (s) | 55.9 | 50.4 | 40.8 | 59.1 | 37.4 | 32.4 | 64.2 | 42.5 | 36.6 | 54.1 | 24.6 | |
| Level of Service | E | D | D | E | D | C | E | D | D | D | C | |
| Approach Delay (s) | | 50.5 | | | 42.3 | | | 41.3 | | | 32.0 | |
| Approach LOS | | D | | | D | | | D | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 39.0 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.74 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 117.3 | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 67.1% | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 52 | 694 | 93 | 889 | 583 | 134 | 210 | 294 | 1192 | 323 | 222 | 38 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.98 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4573 | | 3255 | 3139 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4573 | | 3255 | 3139 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 |
| 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) | 57 | 754 | 101 | 966 | 634 | 146 | 228 | 320 | 1296 | 351 | 241 | 41 |
| RTOR Reduction (vph) | 0 | 16 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| Lane Group Flow (vph) | 57 | 839 | 0 | 966 | 762 | 0 | 228 | 320 | 1296 | 351 | 241 | 9 |
| Confl. Peds. (#/hr) | | | | | | | 3 | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 10.0 | 21.0 | | 32.0 | 43.0 | | 15.0 | 25.6 | 61.6 | 12.4 | 23.0 | 23.0 |
| Effective Green, g (s) | 10.0 | 22.5 | | 32.0 | 44.5 | | 15.0 | 27.1 | 61.6 | 12.4 | 24.5 | 24.5 |
| Actuated g/C Ratio | 0.09 | 0.20 | | 0.29 | 0.40 | | 0.14 | 0.25 | 0.56 | 0.11 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 142 | 935 | | 946 | 1269 | | 228 | 826 | 1515 | 366 | 721 | 328 |
| v/s Ratio Prot | 0.04 | c0.18 | | c0.30 | 0.24 | | c0.14 | 0.10 | c0.48 | 0.11 | 0.07 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 |
| v/c Ratio | 0.40 | 0.90 | | 1.02 | 0.60 | | 1.00 | 0.39 | 0.86 | 0.96 | 0.33 | 0.03 |
| Uniform Delay, d1 | 47.2 | 42.6 | | 39.0 | 25.8 | | 47.5 | 34.5 | 20.4 | 48.5 | 35.9 | 33.4 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.91 | 0.58 | 0.29 | 1.02 | 0.93 | 1.00 |
| Incremental Delay, d2 | 2.5 | 13.1 | | 34.7 | 2.1 | | 57.2 | 0.4 | 4.8 | 37.3 | 0.4 | 0.0 |
| Delay (s) | 49.7 | 55.7 | | 73.7 | 27.9 | | 100.3 | 20.4 | 10.8 | 86.7 | 33.6 | 33.5 |
| Level of Service | D | E | | E | C | | F | C | B | F | C | C |
| Approach Delay (s) | | 55.4 | | | 53.2 | | | 23.5 | | | 63.1 | |
| Approach LOS | | E | | | D | | | C | | | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 44.2 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.99 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | 85.0% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2035 PM



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑↑↑ | | ↖ | ↑↑ | | ↗ |
| Volume (vph) | 2303 | 66 | 279 | 0 | 0 | 523 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 1.00 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6381 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6381 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 2503 | 72 | 303 | 0 | 0 | 568 |
| RTOR Reduction (vph) | 5 | 0 | 0 | 0 | 0 | 1 |
| Lane Group Flow (vph) | 2570 | 0 | 303 | 0 | 0 | 567 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 33.5 | | 26.0 | | | 26.0 |
| Effective Green, g (s) | 33.5 | | 26.0 | | | 26.0 |
| Actuated g/C Ratio | 0.49 | | 0.38 | | | 0.38 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 3098 | | 666 | | | 607 |
| v/s Ratio Prot | c0.40 | | 0.17 | | | c0.35 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.83 | | 0.45 | | | 0.93 |
| Uniform Delay, d1 | 15.3 | | 16.2 | | | 20.7 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 2.0 | | 0.5 | | | 21.7 |
| Delay (s) | 17.3 | | 16.7 | | | 42.4 |
| Level of Service | B | | B | | | D |
| Approach Delay (s) | 17.3 | | | 16.7 | 42.4 | |
| Approach LOS | B | | | B | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 21.3 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.88 | | |
| Actuated Cycle Length (s) | 69.0 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 74.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|-------|------|------|------|------|------|-------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1745 | 921 | 408 | 874 | 0 | 0 | 0 | 592 | 0 | 0 | 1030 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1897 | 1001 | 443 | 950 | 0 | 0 | 0 | 643 | 0 | 0 | 1120 | |
| RTOR Reduction (vph) | 0 | 0 | 265 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 241 | |
| Lane Group Flow (vph) | 0 | 1897 | 736 | 443 | 950 | 0 | 0 | 0 | 643 | 0 | 0 | 879 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 79.5 | 79.5 | 18.5 | 105.0 | | | | 38.5 | | | 38.5 | |
| Effective Green, g (s) | | 79.5 | 79.5 | 18.5 | 105.0 | | | | 38.5 | | | 38.5 | |
| Actuated g/C Ratio | | 0.53 | 0.53 | 0.12 | 0.70 | | | | 0.26 | | | 0.26 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1778 | 1400 | 387 | 2348 | | | | 748 | | | 715 | |
| v/s Ratio Prot | | c0.57 | | c0.14 | 0.28 | | | | 0.22 | | | c0.32 | |
| v/s Ratio Perm | | | 0.28 | | | | | | | | | | |
| v/c Ratio | | 1.07 | 0.53 | 1.14 | 0.40 | | | | 0.86 | | | 1.23 | |
| Uniform Delay, d1 | | 35.2 | 23.0 | 65.8 | 9.4 | | | | 53.2 | | | 55.8 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 41.8 | 0.4 | 91.3 | 0.1 | | | | 9.7 | | | 115.4 | |
| Delay (s) | | 77.0 | 23.3 | 157.1 | 9.5 | | | | 62.9 | | | 171.1 | |
| Level of Service | | E | C | F | A | | | | E | | | F | |
| Approach Delay (s) | | 58.5 | | | 56.5 | | | 62.9 | | | 171.1 | | |
| Approach LOS | | E | | | E | | | E | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 79.3 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 1.12 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 150.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 76.4% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Marina Blvd & I-880 NB Ramps

2035 PM



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 759 | 0 | 803 | 502 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 825 | 0 | 873 | 546 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 76 | 0 | 0 |
| Lane Group Flow (vph) | 825 | 0 | 873 | 470 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 34.6 | | 24.3 | 24.3 | | |
| Effective Green, g (s) | 34.6 | | 24.3 | 24.3 | | |
| Actuated g/C Ratio | 0.51 | | 0.36 | 0.36 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 825 | | 1200 | 547 | | |
| v/s Ratio Prot | c0.51 | | 0.26 | | | |
| v/s Ratio Perm | | | | c0.31 | | |
| v/c Ratio | 1.00 | | 0.73 | 0.86 | | |
| Uniform Delay, d1 | 16.7 | | 18.9 | 20.2 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 31.3 | | 2.2 | 12.7 | | |
| Delay (s) | 48.0 | | 21.2 | 32.9 | | |
| Level of Service | D | | C | C | | |
| Approach Delay (s) | | 48.0 | 25.7 | | 0.0 | |
| Approach LOS | | D | C | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 33.9 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.94 | | |
| Actuated Cycle Length (s) | 67.9 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 80.6% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | ↘ | ↑↑↑ | ↗ | ↘ | ↑↑↑ | | ↘ | ↗ | ↗ | | ↗ | ↗ |
| Volume (vph) | 334 | 1702 | 322 | 180 | 685 | 30 | 365 | 25 | 115 | 20 | 49 | 57 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1530 | 1678 | 4620 | | 1539 | 1552 | 1514 | | 1740 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1530 | 1678 | 4620 | | 1539 | 1552 | 1514 | | 1740 | 1489 |
| 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) | 363 | 1850 | 350 | 196 | 745 | 33 | 397 | 27 | 125 | 22 | 53 | 62 |
| RTOR Reduction (vph) | 0 | 0 | 158 | 0 | 3 | 0 | 0 | 0 | 100 | 0 | 0 | 59 |
| Lane Group Flow (vph) | 363 | 1850 | 192 | 196 | 775 | 0 | 210 | 214 | 25 | 0 | 75 | 3 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 29.1 | 51.5 | 51.5 | 12.0 | 34.4 | | 22.0 | 22.0 | 22.0 | | 5.3 | 5.3 |
| Effective Green, g (s) | 29.1 | 51.5 | 51.5 | 12.0 | 34.4 | | 22.0 | 22.0 | 22.0 | | 5.3 | 5.3 |
| Actuated g/C Ratio | 0.26 | 0.47 | 0.47 | 0.11 | 0.31 | | 0.20 | 0.20 | 0.20 | | 0.05 | 0.05 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 428 | 2179 | 716 | 183 | 1444 | | 307 | 310 | 302 | | 83 | 71 |
| v/s Ratio Prot | 0.22 | c0.40 | | c0.12 | 0.17 | | 0.14 | c0.14 | | | c0.04 | 0.00 |
| v/s Ratio Perm | | | 0.13 | | | | | | 0.02 | | | |
| v/c Ratio | 0.85 | 0.85 | 0.27 | 1.07 | 0.54 | | 0.68 | 0.69 | 0.08 | | 0.90 | 0.04 |
| Uniform Delay, d1 | 38.4 | 25.8 | 17.8 | 49.0 | 31.2 | | 40.8 | 40.8 | 35.8 | | 52.1 | 49.9 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.82 | 0.81 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 15.0 | 4.4 | 0.9 | 84.2 | 1.3 | | 6.7 | 7.0 | 0.2 | | 68.1 | 0.3 |
| Delay (s) | 53.3 | 30.2 | 18.7 | 124.5 | 26.8 | | 47.5 | 47.8 | 36.0 | | 120.2 | 50.3 |
| Level of Service | D | C | B | F | C | | D | D | D | | F | D |
| Approach Delay (s) | | 31.9 | | | 46.4 | | | 45.0 | | | 88.5 | |
| Approach LOS | | C | | | D | | | D | | | F | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 38.8 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.84 | D |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 73.1% | 19.2 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | D |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|------|-------|------|
| Lane Configurations | ↖ | ↗ | ↘ | ↖ | ↗ | | ↖ | ↗ | ↘ | ↖ | ↗ | ↘ |
| Volume (vph) | 92 | 1443 | 190 | 297 | 568 | 46 | 214 | 355 | 713 | 31 | 117 | 74 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3246 | | 3143 | 3240 | 1660 | 3204 | 3025 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3246 | | 3143 | 3240 | 1660 | 3204 | 3025 | |
| 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) | 100 | 1568 | 207 | 323 | 617 | 50 | 233 | 386 | 775 | 34 | 127 | 80 |
| RTOR Reduction (vph) | 0 | 0 | 89 | 0 | 5 | 0 | 0 | 0 | 184 | 0 | 71 | 0 |
| Lane Group Flow (vph) | 100 | 1568 | 118 | 323 | 662 | 0 | 233 | 386 | 591 | 34 | 136 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 10.5 | 42.4 | 42.4 | 16.0 | 47.9 | | 21.7 | 31.2 | 31.2 | 2.4 | 12.3 | |
| Effective Green, g (s) | 10.5 | 42.4 | 42.4 | 16.0 | 47.9 | | 21.7 | 31.2 | 31.2 | 2.4 | 12.3 | |
| Actuated g/C Ratio | 0.10 | 0.39 | 0.39 | 0.15 | 0.44 | | 0.20 | 0.28 | 0.28 | 0.02 | 0.11 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 154 | 1273 | 578 | 240 | 1413 | | 620 | 918 | 470 | 69 | 338 | |
| v/s Ratio Prot | 0.06 | c0.47 | | c0.20 | 0.20 | | 0.07 | 0.12 | | 0.01 | c0.04 | |
| v/s Ratio Perm | | | 0.08 | | | | | | c0.36 | | | |
| v/c Ratio | 0.65 | 1.23 | 0.20 | 1.35 | 0.47 | | 0.38 | 0.42 | 1.26 | 0.49 | 0.40 | |
| Uniform Delay, d1 | 48.0 | 33.8 | 22.5 | 47.0 | 22.0 | | 38.3 | 32.0 | 39.4 | 53.2 | 45.4 | |
| Progression Factor | 1.52 | 0.32 | 0.06 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.9 | 108.3 | 0.4 | 180.8 | 1.1 | | 0.5 | 0.4 | 132.1 | 7.4 | 1.1 | |
| Delay (s) | 76.8 | 119.0 | 1.7 | 227.8 | 23.1 | | 38.8 | 32.5 | 171.5 | 60.6 | 46.5 | |
| Level of Service | E | F | A | F | C | | D | C | F | E | D | |
| Approach Delay (s) | | 103.8 | | | 89.9 | | | 110.8 | | | 48.5 | |
| Approach LOS | | F | | | F | | | F | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 100.0 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 1.24 | F |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 99.3% | ICU Level of Service |
| Analysis Period (min) | 15 | F |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|-------|------|------|------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 1035 | 688 | 463 | 4 | 287 | 48 | 229 | 951 | 14 | 87 | 977 | 428 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1737 | 1478 | 1652 | 3530 | | 1652 | 3134 | |
| Flt Permitted | 0.18 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 320 | 1739 | 1770 | | 1722 | 1478 | 1652 | 3530 | | 1652 | 3134 | |
| 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) | 1125 | 748 | 503 | 4 | 312 | 52 | 249 | 1034 | 15 | 95 | 1062 | 465 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1 | 0 | 0 | 48 | 0 |
| Lane Group Flow (vph) | 1125 | 748 | 503 | 0 | 316 | 11 | 249 | 1048 | 0 | 95 | 1479 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 44.4 | 44.4 | 100.0 | | 20.9 | 20.9 | 17.3 | 33.0 | | 8.1 | 23.3 | |
| Effective Green, g (s) | 44.4 | 44.4 | 100.0 | | 20.9 | 20.9 | 17.3 | 33.0 | | 8.1 | 23.3 | |
| Actuated g/C Ratio | 0.44 | 0.44 | 1.00 | | 0.21 | 0.21 | 0.17 | 0.33 | | 0.08 | 0.23 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 401 | 772 | 1770 | | 359 | 308 | 285 | 1164 | | 133 | 730 | |
| v/s Ratio Prot | c0.55 | 0.43 | | | | | c0.15 | c0.30 | | 0.06 | c0.47 | |
| v/s Ratio Perm | c0.70 | | 0.28 | | 0.18 | 0.01 | | | | | | |
| v/c Ratio | 2.81 | 0.97 | 0.28 | | 0.88 | 0.04 | 0.87 | 0.90 | | 0.71 | 2.03 | |
| Uniform Delay, d1 | 26.5 | 27.1 | 0.0 | | 38.3 | 31.5 | 40.3 | 31.9 | | 44.8 | 38.4 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 819.4 | 24.8 | 0.4 | | 21.8 | 0.1 | 24.3 | 11.2 | | 16.6 | 466.3 | |
| Delay (s) | 845.8 | 51.9 | 0.4 | | 60.2 | 31.6 | 64.5 | 43.1 | | 61.4 | 504.7 | |
| Level of Service | F | D | A | | E | C | E | D | | E | F | |
| Approach Delay (s) | | 416.9 | | | 56.1 | | | 47.2 | | | 478.7 | |
| Approach LOS | | F | | | E | | | D | | | F | |

| Intersection Summary | | |
|-----------------------------------|--------|---------------------------|
| HCM 2000 Control Delay | 326.5 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 2.25 | F |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 144.2% | 19.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | H |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

2035 PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 61 | 26 | 38 | 85 | 149 | 57 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 66 | 28 | 41 | 92 | 162 | 62 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 95 | 134 | 224 | | | |
| Volume Left (vph) | 66 | 41 | 0 | | | |
| Volume Right (vph) | 28 | 0 | 62 | | | |
| Hadj (s) | -0.01 | 0.10 | -0.13 | | | |
| Departure Headway (s) | 4.7 | 4.5 | 4.2 | | | |
| Degree Utilization, x | 0.12 | 0.17 | 0.26 | | | |
| Capacity (veh/h) | 710 | 777 | 835 | | | |
| Control Delay (s) | 8.3 | 8.3 | 8.6 | | | |
| Approach Delay (s) | 8.3 | 8.3 | 8.6 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.5 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 32.9% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

2035 PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 9 | 4 | 6 | 113 | 109 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 10 | 4 | 7 | 123 | 118 | 21 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 14 | 129 | 139 | | | |
| Volume Left (vph) | 10 | 7 | 0 | | | |
| Volume Right (vph) | 4 | 0 | 21 | | | |
| Hadj (s) | -0.01 | 0.04 | -0.06 | | | |
| Departure Headway (s) | 4.5 | 4.1 | 4.0 | | | |
| Degree Utilization, x | 0.02 | 0.15 | 0.15 | | | |
| Capacity (veh/h) | 759 | 859 | 888 | | | |
| Control Delay (s) | 7.5 | 7.8 | 7.7 | | | |
| Approach Delay (s) | 7.5 | 7.8 | 7.7 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 7.8 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 20.8% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Signalized Intersection Capacity Analysis

21: Monarch Bay Drive & Fairway Drive

2035 PM



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Volume (vph) | 38 | 56 | 66 | 62 | 39 | 71 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Util. Factor | 1.00 | | 1.00 | | | 1.00 |
| Frt | 0.92 | | 0.93 | | | 1.00 |
| Flt Protected | 0.98 | | 1.00 | | | 0.98 |
| Satd. Flow (prot) | 1679 | | 1742 | | | 1830 |
| Flt Permitted | 0.98 | | 1.00 | | | 0.88 |
| Satd. Flow (perm) | 1679 | | 1742 | | | 1641 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 41 | 61 | 72 | 67 | 42 | 77 |
| RTOR Reduction (vph) | 37 | 0 | 40 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 65 | 0 | 99 | 0 | 0 | 119 |
| Turn Type | Prot | | NA | | Perm | NA |
| Protected Phases | 8 | | 2 | | | 6 |
| Permitted Phases | | | | | 6 | |
| Actuated Green, G (s) | 18.0 | | 18.0 | | | 18.0 |
| Effective Green, g (s) | 18.0 | | 18.0 | | | 18.0 |
| Actuated g/C Ratio | 0.40 | | 0.40 | | | 0.40 |
| Clearance Time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Grp Cap (vph) | 671 | | 696 | | | 656 |
| v/s Ratio Prot | c0.04 | | 0.06 | | | |
| v/s Ratio Perm | | | | | | c0.07 |
| v/c Ratio | 0.10 | | 0.14 | | | 0.18 |
| Uniform Delay, d1 | 8.4 | | 8.6 | | | 8.7 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.3 | | 0.4 | | | 0.6 |
| Delay (s) | 8.7 | | 9.0 | | | 9.3 |
| Level of Service | A | | A | | | A |
| Approach Delay (s) | 8.7 | | 9.0 | | | 9.3 |
| Approach LOS | A | | A | | | A |



















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 9.0 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.14 | | |
| Actuated Cycle Length (s) | 45.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 30.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2035 PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 8 | 116 | 12 | 31 | 139 | 44 | 10 | 21 | 23 | 36 | 24 | 23 |
| 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 |
| Hourly flow rate (vph) | 9 | 126 | 13 | 34 | 151 | 48 | 11 | 23 | 25 | 39 | 26 | 25 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 9 | 139 | 233 | 59 | 90 | | | | | | | |
| Volume Left (vph) | 9 | 0 | 34 | 11 | 39 | | | | | | | |
| Volume Right (vph) | 0 | 13 | 48 | 25 | 25 | | | | | | | |
| Hadj (s) | 0.53 | -0.03 | -0.06 | -0.18 | -0.05 | | | | | | | |
| Departure Headway (s) | 5.6 | 5.0 | 4.5 | 4.7 | 4.8 | | | | | | | |
| Degree Utilization, x | 0.01 | 0.19 | 0.29 | 0.08 | 0.12 | | | | | | | |
| Capacity (veh/h) | 619 | 684 | 766 | 692 | 682 | | | | | | | |
| Control Delay (s) | 7.5 | 8.1 | 9.3 | 8.1 | 8.5 | | | | | | | |
| Approach Delay (s) | 8.0 | | 9.3 | 8.1 | 8.5 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.7 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 38.0% | | ICU Level of Service | | A | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 23: Doolittle Dr & Fairway Drive/Fairway Dr

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 39 | 113 | 61 | 111 | 112 | 363 | 44 | 442 | 156 | 187 | 588 | 70 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 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 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | | 1.00 | 0.98 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1713 | 1258 | 1620 | 1739 | 1315 | 1711 | 2939 | | 1620 | 3026 | |
| Flt Permitted | | 0.89 | 1.00 | 0.65 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1548 | 1258 | 1113 | 1739 | 1315 | 1711 | 2939 | | 1620 | 3026 | |
| 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) | 42 | 123 | 66 | 121 | 122 | 395 | 48 | 480 | 170 | 203 | 639 | 76 |
| RTOR Reduction (vph) | 0 | 0 | 51 | 0 | 0 | 304 | 0 | 48 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 0 | 165 | 15 | 121 | 122 | 91 | 48 | 602 | 0 | 203 | 705 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 4.4 | 19.6 | | 12.5 | 27.7 | |
| Effective Green, g (s) | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 4.4 | 19.6 | | 12.5 | 27.7 | |
| Actuated g/C Ratio | | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.07 | 0.32 | | 0.20 | 0.45 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 354 | 288 | 255 | 398 | 301 | 123 | 942 | | 331 | 1371 | |
| v/s Ratio Prot | | | | | 0.07 | | 0.03 | c0.20 | | c0.13 | 0.23 | |
| v/s Ratio Perm | | 0.11 | 0.01 | c0.11 | | 0.07 | | | | | | |
| v/c Ratio | | 0.47 | 0.05 | 0.47 | 0.31 | 0.30 | 0.39 | 0.64 | | 0.61 | 0.51 | |
| Uniform Delay, d1 | | 20.3 | 18.4 | 20.4 | 19.5 | 19.5 | 27.1 | 17.7 | | 22.1 | 11.9 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.0 | 0.1 | 1.4 | 0.4 | 0.6 | 2.0 | 1.6 | | 3.4 | 0.4 | |
| Delay (s) | | 21.3 | 18.5 | 21.8 | 20.0 | 20.1 | 29.1 | 19.3 | | 25.5 | 12.3 | |
| Level of Service | | C | B | C | B | C | C | B | | C | B | |
| Approach Delay (s) | | 20.5 | | | 20.4 | | | 20.0 | | | 15.2 | |
| Approach LOS | | C | | | C | | | C | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.4 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.58 | | |
| Actuated Cycle Length (s) | 61.1 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 61.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 195 | 330 | 115 | 135 | 358 | 87 | 147 | 612 | 155 | 129 | 617 | 138 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3126 | | 1593 | 3137 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3126 | | 1593 | 3137 | |
| 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) | 212 | 359 | 125 | 147 | 389 | 95 | 160 | 665 | 168 | 140 | 671 | 150 |
| RTOR Reduction (vph) | 0 | 0 | 92 | 0 | 0 | 73 | 0 | 20 | 0 | 0 | 17 | 0 |
| Lane Group Flow (vph) | 212 | 359 | 33 | 147 | 389 | 22 | 160 | 813 | 0 | 140 | 804 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 17.5 | 29.3 | 29.3 | 13.5 | 25.3 | 25.3 | 14.2 | 36.1 | | 12.1 | 34.0 | |
| Effective Green, g (s) | 17.5 | 29.3 | 29.3 | 13.5 | 25.3 | 25.3 | 14.2 | 36.1 | | 12.1 | 34.0 | |
| Actuated g/C Ratio | 0.16 | 0.27 | 0.27 | 0.12 | 0.23 | 0.23 | 0.13 | 0.33 | | 0.11 | 0.31 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 250 | 491 | 347 | 195 | 428 | 310 | 213 | 1025 | | 175 | 969 | |
| v/s Ratio Prot | c0.13 | 0.19 | | 0.09 | c0.21 | | 0.10 | c0.26 | | 0.09 | c0.26 | |
| v/s Ratio Perm | | | 0.03 | | | 0.02 | | | | | | |
| v/c Ratio | 0.85 | 0.73 | 0.10 | 0.75 | 0.91 | 0.07 | 0.75 | 0.79 | | 0.80 | 0.83 | |
| Uniform Delay, d1 | 45.0 | 36.8 | 30.4 | 46.6 | 41.2 | 33.1 | 46.2 | 33.6 | | 47.8 | 35.3 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.94 | 0.93 | | 0.80 | 0.85 | |
| Incremental Delay, d2 | 23.3 | 5.9 | 0.2 | 16.0 | 23.1 | 0.1 | 14.0 | 6.0 | | 22.2 | 7.7 | |
| Delay (s) | 68.2 | 42.7 | 30.5 | 62.7 | 64.3 | 33.3 | 57.6 | 37.2 | | 60.5 | 37.7 | |
| Level of Service | E | D | C | E | E | C | E | D | | E | D | |
| Approach Delay (s) | | 48.3 | | | 59.3 | | | 40.5 | | | 41.0 | |
| Approach LOS | | D | | | E | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 45.9 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.87 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 75.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|--------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 55 | 507 | 3 | 6 | 391 | 112 | 10 | 0 | 7 | 285 | 0 | 102 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | | 1.00 |
| Frt | 1.00 | 1.00 | | | 0.97 | | | 0.94 | | 1.00 | | 0.85 |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.97 | | 0.95 | | 1.00 |
| Satd. Flow (prot) | 1770 | 1861 | | | 3420 | | | 1707 | | 1770 | | 1583 |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.97 | | 0.75 | | 1.00 |
| Satd. Flow (perm) | 1770 | 1861 | | | 3245 | | | 1707 | | 1388 | | 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) | 60 | 551 | 3 | 7 | 425 | 122 | 11 | 0 | 8 | 310 | 0 | 111 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 13 | 0 | 0 | 0 | 78 |
| Lane Group Flow (vph) | 60 | 554 | 0 | 0 | 508 | 0 | 0 | 6 | 0 | 310 | 0 | 33 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | |
| Permitted Phases | | | | | | | 8 | | | 4 | | 4 |
| Actuated Green, G (s) | 4.0 | 32.1 | | | 23.2 | | | 17.6 | | 17.6 | | 17.6 |
| Effective Green, g (s) | 4.0 | 32.1 | | | 23.2 | | | 17.6 | | 17.6 | | 17.6 |
| Actuated g/C Ratio | 0.07 | 0.55 | | | 0.40 | | | 0.30 | | 0.30 | | 0.30 |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Grp Cap (vph) | 120 | 1019 | | | 1284 | | | 512 | | 416 | | 475 |
| v/s Ratio Prot | 0.03 | c0.30 | | | | | | | | | | |
| v/s Ratio Perm | | | | | 0.16 | | | 0.00 | | c0.22 | | 0.02 |
| v/c Ratio | 0.50 | 0.54 | | | 1.61dr | | | 0.01 | | 0.75 | | 0.07 |
| Uniform Delay, d1 | 26.3 | 8.5 | | | 12.7 | | | 14.4 | | 18.5 | | 14.7 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | | 1.00 |
| Incremental Delay, d2 | 1.2 | 0.7 | | | 0.3 | | | 0.0 | | 7.6 | | 0.1 |
| Delay (s) | 27.5 | 9.3 | | | 13.0 | | | 14.4 | | 26.0 | | 14.7 |
| Level of Service | C | A | | | B | | | B | | C | | B |
| Approach Delay (s) | | 11.1 | | | 13.0 | | | 14.4 | | | 23.1 | |
| Approach LOS | | B | | | B | | | B | | | C | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 14.9 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 58.6 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 75.4% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
26: Miller St & Fairway Dr/Aladdin Ave

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 54 | 646 | 13 | 20 | 530 | 112 | 68 | 3 | 64 | 286 | 4 | 102 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.86 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1856 | | 1593 | 1935 | | 1711 | 1542 | | 1770 | 1593 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.68 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1856 | | 1593 | 1935 | | 1230 | 1542 | | 1770 | 1593 | |
| 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) | 59 | 702 | 14 | 22 | 576 | 122 | 74 | 3 | 70 | 311 | 4 | 111 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 62 | 0 | 0 | 74 | 0 |
| Lane Group Flow (vph) | 59 | 715 | 0 | 22 | 692 | 0 | 74 | 11 | 0 | 311 | 41 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 6.1 | 41.9 | | 2.6 | 38.4 | | 9.5 | 9.5 | | 15.4 | 28.9 | |
| Effective Green, g (s) | 6.1 | 41.9 | | 2.6 | 38.4 | | 9.5 | 9.5 | | 15.4 | 28.9 | |
| Actuated g/C Ratio | 0.07 | 0.48 | | 0.03 | 0.44 | | 0.11 | 0.11 | | 0.18 | 0.33 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 123 | 891 | | 47 | 852 | | 134 | 167 | | 312 | 527 | |
| v/s Ratio Prot | c0.03 | c0.39 | | 0.01 | 0.36 | | | 0.01 | | c0.18 | 0.03 | |
| v/s Ratio Perm | | | | | | | c0.06 | | | | | |
| v/c Ratio | 0.48 | 0.80 | | 0.47 | 0.81 | | 0.55 | 0.06 | | 1.00 | 0.08 | |
| Uniform Delay, d1 | 39.0 | 19.2 | | 41.6 | 21.3 | | 36.8 | 34.9 | | 35.9 | 20.0 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.1 | 5.6 | | 2.7 | 6.2 | | 6.0 | 0.2 | | 49.7 | 0.1 | |
| Delay (s) | 40.1 | 24.7 | | 44.3 | 27.5 | | 42.8 | 35.1 | | 85.6 | 20.1 | |
| Level of Service | D | C | | D | C | | D | D | | F | C | |
| Approach Delay (s) | | 25.9 | | | 28.0 | | | 39.0 | | | 67.9 | |
| Approach LOS | | C | | | C | | | D | | | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 36.2 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.82 | | |
| Actuated Cycle Length (s) | 87.2 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 72.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Teagarden St & Aladdin Ave

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 117 | 840 | 199 | 3 | 384 | 64 | 61 | 101 | 19 | 67 | 204 | 155 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1965 | | 1711 | 1676 | | 1652 | 1810 | | 1643 | 1777 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.28 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1965 | | 1711 | 1676 | | 480 | 1810 | | 1164 | 1777 | |
| 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) | 127 | 913 | 216 | 3 | 417 | 70 | 66 | 110 | 21 | 73 | 222 | 168 |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 8 | 0 | 0 | 10 | 0 | 0 | 39 | 0 |
| Lane Group Flow (vph) | 127 | 1119 | 0 | 3 | 479 | 0 | 66 | 121 | 0 | 73 | 351 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 8.8 | 33.0 | | 1.2 | 25.4 | | 17.8 | 17.8 | | 17.8 | 17.8 | |
| Effective Green, g (s) | 8.8 | 33.0 | | 1.2 | 25.4 | | 17.8 | 17.8 | | 17.8 | 17.8 | |
| Actuated g/C Ratio | 0.14 | 0.51 | | 0.02 | 0.39 | | 0.27 | 0.27 | | 0.27 | 0.27 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 231 | 997 | | 31 | 654 | | 131 | 495 | | 318 | 486 | |
| v/s Ratio Prot | c0.07 | c0.57 | | 0.00 | 0.29 | | | 0.07 | | | c0.20 | |
| v/s Ratio Perm | | | | | | | 0.14 | | | 0.06 | | |
| v/c Ratio | 0.55 | 1.12 | | 0.10 | 0.73 | | 0.50 | 0.24 | | 0.23 | 0.72 | |
| Uniform Delay, d1 | 26.2 | 16.0 | | 31.4 | 16.9 | | 19.9 | 18.4 | | 18.3 | 21.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.3 | 68.5 | | 1.9 | 4.5 | | 4.1 | 0.4 | | 0.5 | 5.6 | |
| Delay (s) | 29.6 | 84.5 | | 33.2 | 21.4 | | 24.0 | 18.7 | | 18.8 | 27.0 | |
| Level of Service | C | F | | C | C | | C | B | | B | C | |
| Approach Delay (s) | | 78.9 | | | 21.5 | | | 20.5 | | | 25.7 | |
| Approach LOS | | E | | | C | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 52.2 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.99 | | |
| Actuated Cycle Length (s) | 65.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 99.4% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Alvarado St & Aladdin Ave

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↑↑ | ↗ | ↖ | ↑↗ | |
| Volume (vph) | 443 | 4 | 518 | 16 | 5 | 12 | 265 | 728 | 1 | 3 | 570 | 121 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | | 1.00 | 0.89 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1499 | | 1652 | 1529 | | 1652 | 3240 | 1440 | 1711 | 3278 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1499 | | 1652 | 1529 | | 1652 | 3240 | 1440 | 1711 | 3278 | |
| 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) | 482 | 4 | 563 | 17 | 5 | 13 | 288 | 791 | 1 | 3 | 620 | 132 |
| RTOR Reduction (vph) | 0 | 266 | 0 | 0 | 11 | 0 | 0 | 0 | 1 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 482 | 301 | 0 | 17 | 7 | 0 | 288 | 791 | 0 | 3 | 738 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | 0 | 0 | | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 32.1 | 43.8 | | 1.9 | 13.6 | | 19.1 | 47.3 | 47.3 | 0.7 | 28.9 | |
| Effective Green, g (s) | 32.1 | 43.8 | | 1.9 | 13.6 | | 19.1 | 47.3 | 47.3 | 0.7 | 28.9 | |
| Actuated g/C Ratio | 0.29 | 0.40 | | 0.02 | 0.12 | | 0.17 | 0.43 | 0.43 | 0.01 | 0.26 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 481 | 595 | | 28 | 188 | | 286 | 1390 | 618 | 10 | 859 | |
| v/s Ratio Prot | c0.29 | c0.20 | | 0.01 | 0.00 | | c0.17 | 0.24 | | 0.00 | c0.23 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 1.00 | 0.51 | | 0.61 | 0.04 | | 1.01 | 0.57 | 0.00 | 0.30 | 0.86 | |
| Uniform Delay, d1 | 39.0 | 25.0 | | 53.8 | 42.5 | | 45.5 | 23.8 | 18.0 | 54.5 | 38.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 41.5 | 1.4 | | 44.5 | 0.2 | | 55.0 | 0.9 | 0.0 | 32.2 | 9.4 | |
| Delay (s) | 80.6 | 26.4 | | 98.2 | 42.7 | | 100.6 | 24.6 | 18.0 | 86.7 | 48.1 | |
| Level of Service | F | C | | F | D | | F | C | B | F | D | |
| Approach Delay (s) | | 51.3 | | | 69.7 | | | 44.9 | | | 48.2 | |
| Approach LOS | | D | | | E | | | D | | | D | |

| Intersection Summary | |
|-----------------------------------|-------|
| HCM 2000 Control Delay | 48.4 |
| HCM 2000 Volume to Capacity ratio | 0.90 |
| Actuated Cycle Length (s) | 110.2 |
| Intersection Capacity Utilization | 77.2% |
| Analysis Period (min) | 15 |
| HCM 2000 Level of Service | D |
| Sum of lost time (s) | 16.5 |
| ICU Level of Service | D |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|------|-------|------|------|------|-------|------|------|
| Lane Configurations | | ↕ | | | ↕ | ↗ | ↖ | ↕↕↕ | | ↖ | ↕↕ | |
| Volume (vph) | 3 | 0 | 0 | 20 | 0 | 77 | 0 | 1636 | 43 | 97 | 1121 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | | 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 | 1.00 | |
| Flt Protected | | 0.95 | | | 0.95 | 1.00 | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1770 | | | 1562 | 1397 | | 4932 | | 1619 | 3470 | |
| Flt Permitted | | 0.74 | | | 0.76 | 1.00 | | 1.00 | | 0.11 | 1.00 | |
| Satd. Flow (perm) | | 1384 | | | 1243 | 1397 | | 4932 | | 181 | 3470 | |
| 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) | 3 | 0 | 0 | 22 | 0 | 84 | 0 | 1778 | 47 | 105 | 1218 | 2 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 34 | 0 | 2 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 3 | 0 | 0 | 22 | 50 | 0 | 1823 | 0 | 105 | 1220 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 10.1 | | | 10.1 | 10.1 | | 91.3 | | 91.3 | 91.3 | |
| Effective Green, g (s) | | 10.1 | | | 10.1 | 10.1 | | 91.3 | | 91.3 | 91.3 | |
| Actuated g/C Ratio | | 0.09 | | | 0.09 | 0.09 | | 0.83 | | 0.83 | 0.83 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 127 | | | 114 | 128 | | 4093 | | 150 | 2880 | |
| v/s Ratio Prot | | | | | | | | 0.37 | | | 0.35 | |
| v/s Ratio Perm | | 0.00 | | | 0.02 | c0.04 | | | | c0.58 | | |
| v/c Ratio | | 0.02 | | | 0.19 | 0.39 | | 0.45 | | 0.70 | 0.42 | |
| Uniform Delay, d1 | | 45.5 | | | 46.2 | 47.1 | | 2.5 | | 3.8 | 2.5 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 0.44 | | 1.63 | 0.10 | |
| Incremental Delay, d2 | | 0.1 | | | 0.8 | 2.0 | | 0.2 | | 11.9 | 0.2 | |
| Delay (s) | | 45.5 | | | 47.0 | 49.1 | | 1.4 | | 18.0 | 0.5 | |
| Level of Service | | D | | | D | D | | A | | B | A | |
| Approach Delay (s) | | 45.5 | | | 48.6 | | | 1.4 | | | 1.9 | |
| Approach LOS | | D | | | D | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.1 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.67 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.6 |
| Intersection Capacity Utilization | 53.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 30: Merced Street & Republic Ave

2035 PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|-------|------|------|-------|------|-------|------|---------------------------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕↕ | ↕ | ↕↕ | ↕ | ↕↕ | ↕↕ | ↕↕ | |
| Volume (vph) | 56 | 8 | 22 | 137 | 9 | 787 | 2 | 1075 | 171 | 395 | 813 | 41 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | |
| Flt Protected | | 0.97 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1705 | | | 1779 | 2787 | 1736 | 3471 | 1583 | 3433 | 3442 | | |
| Flt Permitted | | 0.66 | | | 0.69 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1168 | | | 1277 | 2787 | 1736 | 3471 | 1583 | 3433 | 3442 | | |
| 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) | 61 | 9 | 24 | 149 | 10 | 855 | 2 | 1168 | 186 | 429 | 884 | 45 | |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 0 | 681 | 0 | 0 | 65 | 0 | 2 | 0 | |
| Lane Group Flow (vph) | 0 | 82 | 0 | 0 | 159 | 174 | 2 | 1168 | 121 | 429 | 927 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | |
| Actuated Green, G (s) | | 22.4 | | | 22.4 | 22.4 | 1.2 | 42.8 | 42.8 | 31.3 | 72.9 | | |
| Effective Green, g (s) | | 22.4 | | | 22.4 | 22.4 | 1.2 | 42.8 | 42.8 | 31.3 | 72.9 | | |
| Actuated g/C Ratio | | 0.20 | | | 0.20 | 0.20 | 0.01 | 0.39 | 0.39 | 0.28 | 0.66 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | | 237 | | | 260 | 567 | 18 | 1350 | 615 | 976 | 2281 | | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.34 | | c0.12 | 0.27 | | |
| v/s Ratio Perm | | 0.07 | | | c0.12 | 0.06 | | | 0.08 | | | | |
| v/c Ratio | | 0.35 | | | 0.61 | 0.31 | 0.11 | 0.87 | 0.20 | 0.44 | 0.41 | | |
| Uniform Delay, d1 | | 37.5 | | | 39.8 | 37.2 | 53.9 | 30.9 | 22.2 | 32.2 | 8.6 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.37 | 0.56 | 0.32 | 0.40 | 0.24 | | |
| Incremental Delay, d2 | | 0.9 | | | 4.2 | 0.3 | 2.3 | 6.6 | 0.6 | 0.3 | 0.5 | | |
| Delay (s) | | 38.4 | | | 44.1 | 37.5 | 75.9 | 23.8 | 7.8 | 13.1 | 2.5 | | |
| Level of Service | | D | | | D | D | E | C | A | B | A | | |
| Approach Delay (s) | | 38.4 | | | 38.5 | | | 21.7 | | | 5.9 | | |
| Approach LOS | | D | | | D | | | C | | | A | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.0 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.67 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 73.5% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

2035 PM



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 46 | 41 | 14 | 882 | 782 | 29 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3221 | |
| Flt Permitted | 0.95 | 1.00 | 0.32 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 560 | 3240 | 3221 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 50 | 45 | 15 | 959 | 850 | 32 |
| RTOR Reduction (vph) | 0 | 41 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 50 | 4 | 15 | 959 | 878 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 5.0 | 5.0 | 41.0 | 41.0 | 41.0 | |
| Effective Green, g (s) | 5.0 | 5.0 | 41.0 | 41.0 | 41.0 | |
| Actuated g/C Ratio | 0.09 | 0.09 | 0.75 | 0.75 | 0.75 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 150 | 120 | 417 | 2415 | 2401 | |
| v/s Ratio Prot | c0.03 | | | c0.30 | 0.27 | |
| v/s Ratio Perm | | 0.00 | 0.03 | | | |
| v/c Ratio | 0.33 | 0.03 | 0.04 | 0.40 | 0.37 | |
| Uniform Delay, d1 | 23.4 | 22.8 | 1.8 | 2.5 | 2.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.29 | |
| Incremental Delay, d2 | 1.3 | 0.1 | 0.2 | 0.5 | 0.3 | |
| Delay (s) | 24.8 | 22.9 | 2.0 | 3.0 | 1.0 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 3.0 | 1.0 | |
| Approach LOS | C | | | A | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.1 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2035 Saturday

HCM Signalized Intersection Capacity Analysis

2035 SAT

1: Doolittle Dr & Davis St



















| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|-------|------|-------|------|------|-------|-------|------|------|
| Lane Configurations | ↘ | ↗ | | ↘ | ↗ | ↗ | ↘ | ↗ | ↗ | ↘ | ↗ | ↘ |
| Volume (vph) | 12 | 76 | 12 | 189 | 81 | 407 | 16 | 217 | 355 | 601 | 275 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3122 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1435 | 3143 | 3193 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3122 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1435 | 3143 | 3193 | |
| 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) | 13 | 83 | 13 | 205 | 88 | 442 | 17 | 236 | 386 | 653 | 299 | 27 |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 0 | 205 | 0 | 0 | 239 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 13 | 85 | 0 | 205 | 88 | 237 | 17 | 236 | 147 | 653 | 322 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 0.8 | 11.1 | | 10.0 | 20.3 | 39.7 | 3.8 | 18.2 | 28.2 | 19.4 | 33.8 | |
| Effective Green, g (s) | 0.8 | 11.1 | | 10.0 | 20.3 | 39.7 | 3.8 | 18.2 | 28.2 | 19.4 | 33.8 | |
| Actuated g/C Ratio | 0.01 | 0.15 | | 0.14 | 0.27 | 0.54 | 0.05 | 0.25 | 0.38 | 0.26 | 0.46 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 18 | 468 | | 439 | 463 | 799 | 83 | 1144 | 546 | 823 | 1458 | |
| v/s Ratio Prot | 0.01 | 0.03 | | c0.06 | 0.05 | c0.08 | 0.01 | 0.05 | c0.04 | c0.21 | 0.10 | |
| v/s Ratio Perm | | | | | | 0.08 | | | 0.07 | | | |
| v/c Ratio | 0.72 | 0.18 | | 0.47 | 0.19 | 0.30 | 0.20 | 0.21 | 0.27 | 0.79 | 0.22 | |
| Uniform Delay, d1 | 36.5 | 27.5 | | 29.5 | 20.6 | 9.5 | 33.7 | 22.2 | 15.8 | 25.4 | 12.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 77.2 | 0.2 | | 0.3 | 0.2 | 0.1 | 0.4 | 0.1 | 0.1 | 4.9 | 0.1 | |
| Delay (s) | 113.7 | 27.7 | | 29.8 | 20.8 | 9.5 | 34.1 | 22.3 | 15.9 | 30.4 | 12.3 | |
| Level of Service | F | C | | C | C | A | C | C | B | C | B | |
| Approach Delay (s) | | 37.9 | | | 16.5 | | | 18.7 | | | 24.4 | |
| Approach LOS | | D | | | B | | | B | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 21.2 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.49 | | |
| Actuated Cycle Length (s) | 74.0 | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | 52.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2035 SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 20 | 211 | 10 | 23 | 280 | 18 | 4 | 16 | 34 | 14 | 17 | 15 |
| 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 |
| Hourly flow rate (vph) | 22 | 229 | 11 | 25 | 304 | 20 | 4 | 17 | 37 | 15 | 18 | 16 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 262 | 349 | 59 | 50 | | | | | | | | |
| Volume Left (vph) | 22 | 25 | 4 | 15 | | | | | | | | |
| Volume Right (vph) | 11 | 20 | 37 | 16 | | | | | | | | |
| Hadj (s) | 0.03 | 0.01 | -0.33 | -0.10 | | | | | | | | |
| Departure Headway (s) | 4.6 | 4.5 | 5.1 | 5.3 | | | | | | | | |
| Degree Utilization, x | 0.34 | 0.44 | 0.08 | 0.07 | | | | | | | | |
| Capacity (veh/h) | 754 | 771 | 617 | 596 | | | | | | | | |
| Control Delay (s) | 9.9 | 11.0 | 8.5 | 8.7 | | | | | | | | |
| Approach Delay (s) | 9.9 | 11.0 | 8.5 | 8.7 | | | | | | | | |
| Approach LOS | A | B | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.2 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 34.9% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2035 SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 84 | 235 | 30 | 204 | 333 | 173 | 17 | 282 | 192 | 154 | 283 | 69 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 0.99 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | 0.97 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1652 | 1739 | 1450 | 1620 | 1739 | 1400 | 1652 | 3240 | 1332 | 1620 | 2982 | 2982 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1652 | 1739 | 1450 | 1620 | 1739 | 1400 | 1652 | 3240 | 1332 | 1620 | 2982 | 2982 |
| 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) | 91 | 255 | 33 | 222 | 362 | 188 | 18 | 307 | 209 | 167 | 308 | 75 |
| RTOR Reduction (vph) | 0 | 0 | 26 | 0 | 0 | 124 | 0 | 0 | 165 | 0 | 15 | 0 |
| Lane Group Flow (vph) | 91 | 255 | 7 | 222 | 362 | 64 | 18 | 307 | 44 | 167 | 368 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 9.8 | 21.2 | 21.2 | 19.3 | 30.7 | 30.7 | 3.0 | 19.9 | 19.9 | 16.5 | 33.4 | 33.4 |
| Effective Green, g (s) | 9.8 | 21.2 | 21.2 | 19.3 | 30.7 | 30.7 | 3.0 | 19.9 | 19.9 | 16.5 | 33.4 | 33.4 |
| Actuated g/C Ratio | 0.10 | 0.22 | 0.22 | 0.20 | 0.32 | 0.32 | 0.03 | 0.21 | 0.21 | 0.17 | 0.35 | 0.35 |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 170 | 388 | 323 | 329 | 562 | 452 | 52 | 679 | 279 | 281 | 1049 | 1049 |
| v/s Ratio Prot | 0.06 | 0.15 | | c0.14 | c0.21 | | 0.01 | c0.09 | | c0.10 | 0.12 | 0.12 |
| v/s Ratio Perm | | | 0.01 | | | 0.05 | | | 0.03 | | | |
| v/c Ratio | 0.54 | 0.66 | 0.02 | 0.67 | 0.64 | 0.14 | 0.35 | 0.45 | 0.16 | 0.59 | 0.35 | 0.35 |
| Uniform Delay, d1 | 40.4 | 33.5 | 28.8 | 34.9 | 27.4 | 22.8 | 45.0 | 32.7 | 30.6 | 36.1 | 22.7 | 22.7 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 4.1 | 4.4 | 0.0 | 5.9 | 2.8 | 0.2 | 5.4 | 0.7 | 0.4 | 3.9 | 0.3 | 0.3 |
| Delay (s) | 44.5 | 38.0 | 28.8 | 40.8 | 30.3 | 22.9 | 50.4 | 33.4 | 31.0 | 40.0 | 23.0 | 23.0 |
| Level of Service | D | D | C | D | C | C | D | C | C | D | C | C |
| Approach Delay (s) | | 38.7 | | | 31.5 | | | 33.0 | | | 28.2 | |
| Approach LOS | | D | | | C | | | C | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 32.3 | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.61 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 94.9 | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 56.0% | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

2035 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|-------|------|------|
| Lane Configurations | ↖ | ↗↖↗ | | ↖↗ | ↖↗ | | ↖ | ↗↖↗ | ↖↗ | ↖↗ | ↗↖↗ | ↖↗ |
| Volume (vph) | 41 | 572 | 104 | 904 | 571 | 107 | 190 | 237 | 761 | 167 | 167 | 24 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4548 | | 3255 | 3155 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1470 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4548 | | 3255 | 3155 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1470 |
| 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) | 45 | 622 | 113 | 983 | 621 | 116 | 207 | 258 | 827 | 182 | 182 | 26 |
| RTOR Reduction (vph) | 0 | 19 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| Lane Group Flow (vph) | 45 | 716 | 0 | 983 | 726 | 0 | 207 | 258 | 827 | 182 | 182 | 5 |
| Confl. Peds. (#/hr) | | | | | | | 3 | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 9.0 | 25.1 | | 49.0 | 65.1 | | 22.0 | 32.0 | 81.0 | 13.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 9.0 | 26.6 | | 49.0 | 66.6 | | 22.0 | 33.5 | 81.0 | 13.0 | 24.5 | 24.5 |
| Actuated g/C Ratio | 0.07 | 0.19 | | 0.35 | 0.48 | | 0.16 | 0.24 | 0.59 | 0.09 | 0.18 | 0.18 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 101 | 876 | | 1154 | 1521 | | 267 | 813 | 1587 | 306 | 574 | 260 |
| v/s Ratio Prot | 0.03 | c0.16 | | c0.30 | 0.23 | | c0.12 | 0.08 | c0.31 | c0.06 | 0.06 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 |
| v/c Ratio | 0.45 | 0.82 | | 0.85 | 0.48 | | 0.78 | 0.32 | 0.52 | 0.59 | 0.32 | 0.02 |
| Uniform Delay, d1 | 62.1 | 53.4 | | 41.2 | 24.0 | | 55.7 | 42.9 | 17.0 | 60.0 | 49.5 | 46.9 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 4.2 | 6.3 | | 8.0 | 0.3 | | 19.5 | 0.3 | 0.4 | 8.3 | 0.4 | 0.0 |
| Delay (s) | 66.4 | 59.7 | | 49.2 | 24.4 | | 75.2 | 43.2 | 17.4 | 68.3 | 49.9 | 46.9 |
| Level of Service | E | E | | D | C | | E | D | B | E | D | D |
| Approach Delay (s) | | 60.1 | | | 38.6 | | | 31.8 | | | 58.3 | |
| Approach LOS | | E | | | D | | | C | | | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 42.3 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.77 | | |
| Actuated Cycle Length (s) | 138.1 | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | 82.2% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2035 SAT



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|-------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↵ | ↑↑ | | ↵ |
| Volume (vph) | 1456 | 89 | 472 | 0 | 0 | 417 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 0.99 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6352 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6352 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1583 | 97 | 513 | 0 | 0 | 453 |
| RTOR Reduction (vph) | 15 | 0 | 0 | 0 | 0 | 3 |
| Lane Group Flow (vph) | 1665 | 0 | 513 | 0 | 0 | 450 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 21.7 | | 18.8 | | | 18.8 |
| Effective Green, g (s) | 21.7 | | 18.8 | | | 18.8 |
| Actuated g/C Ratio | 0.43 | | 0.38 | | | 0.38 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 2756 | | 665 | | | 605 |
| v/s Ratio Prot | c0.26 | | c0.29 | | | 0.28 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.60 | | 0.77 | | | 0.74 |
| Uniform Delay, d1 | 10.9 | | 13.7 | | | 13.5 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.4 | | 5.5 | | | 4.9 |
| Delay (s) | 11.2 | | 19.2 | | | 18.4 |
| Level of Service | B | | B | | | B |
| Approach Delay (s) | 11.2 | | | 19.2 | 18.4 | |
| Approach LOS | B | | | B | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 56.7% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|------|------|------|-------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1206 | 621 | 476 | 912 | 0 | 0 | 0 | 501 | 0 | 0 | 1077 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 1311 | 675 | 517 | 991 | 0 | 0 | 0 | 545 | 0 | 0 | 1171 |
| RTOR Reduction (vph) | 0 | 0 | 356 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 178 |
| Lane Group Flow (vph) | 0 | 1311 | 319 | 517 | 991 | 0 | 0 | 0 | 545 | 0 | 0 | 993 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 46.5 | 46.5 | 16.5 | 70.0 | | | | 32.5 | | | 32.5 |
| Effective Green, g (s) | | 46.5 | 46.5 | 16.5 | 70.0 | | | | 32.5 | | | 32.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.15 | 0.64 | | | | 0.30 | | | 0.30 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1431 | 1127 | 475 | 2154 | | | | 869 | | | 830 |
| v/s Ratio Prot | | c0.39 | | c0.16 | 0.30 | | | | 0.19 | | | c0.36 |
| v/s Ratio Perm | | | 0.12 | | | | | | | | | |
| v/c Ratio | | 0.92 | 0.28 | 1.09 | 0.46 | | | | 0.63 | | | 1.20 |
| Uniform Delay, d1 | | 29.4 | 20.4 | 46.2 | 9.9 | | | | 33.0 | | | 38.2 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 9.4 | 0.1 | 67.3 | 0.2 | | | | 1.4 | | | 99.9 |
| Delay (s) | | 38.8 | 20.5 | 113.6 | 10.1 | | | | 34.4 | | | 138.2 |
| Level of Service | | D | C | F | B | | | | C | | | F |
| Approach Delay (s) | | 32.6 | | | 45.6 | | | 34.4 | | | 138.2 | |
| Approach LOS | | C | | | D | | | C | | | F | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 60.3 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.04 | | |
| Actuated Cycle Length (s) | 109.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 70.0% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

2035 SAT





















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 508 | 0 | 953 | 556 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 552 | 0 | 1036 | 604 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 86 | 0 | 0 |
| Lane Group Flow (vph) | 552 | 0 | 1036 | 518 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 19.6 | | 22.7 | 22.7 | | |
| Effective Green, g (s) | 19.6 | | 22.7 | 22.7 | | |
| Actuated g/C Ratio | 0.38 | | 0.44 | 0.44 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 618 | | 1484 | 677 | | |
| v/s Ratio Prot | c0.34 | | 0.31 | | | |
| v/s Ratio Perm | | | | c0.34 | | |
| v/c Ratio | 0.89 | | 0.70 | 0.76 | | |
| Uniform Delay, d1 | 14.9 | | 11.5 | 12.0 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 15.2 | | 1.5 | 5.1 | | |
| Delay (s) | 30.1 | | 13.0 | 17.2 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 30.1 | 14.5 | | 0.0 | |
| Approach LOS | | C | B | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 18.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.82 | | |
| Actuated Cycle Length (s) | 51.3 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 70.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2035 SAT

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 4 | 127 | 10 | 24 | 114 | 17 | 15 | 18 | 32 | 14 | 9 | 15 |
| 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 |
| Hourly flow rate (vph) | 4 | 138 | 11 | 26 | 124 | 18 | 16 | 20 | 35 | 15 | 10 | 16 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 4 | 149 | 168 | 71 | 41 | | | | | | | |
| Volume Left (vph) | 4 | 0 | 26 | 16 | 15 | | | | | | | |
| Volume Right (vph) | 0 | 11 | 18 | 35 | 16 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | 0.00 | -0.22 | -0.13 | | | | | | | |
| Departure Headway (s) | 5.4 | 4.9 | 4.5 | 4.5 | 4.6 | | | | | | | |
| Degree Utilization, x | 0.01 | 0.20 | 0.21 | 0.09 | 0.05 | | | | | | | |
| Capacity (veh/h) | 645 | 712 | 777 | 743 | 715 | | | | | | | |
| Control Delay (s) | 7.3 | 7.9 | 8.6 | 7.9 | 7.9 | | | | | | | |
| Approach Delay (s) | 7.9 | | 8.6 | 7.9 | 7.9 | | | | | | | |
| Approach LOS | A | | A | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.2 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 29.9% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 23: Doolittle Dr & Fairway Drive/Fairway Dr

2035 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 59 | 105 | 54 | 67 | 107 | 169 | 47 | 287 | 70 | 108 | 274 | 61 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.97 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1703 | 1259 | 1620 | 1739 | 1318 | 1711 | 2974 | | 1620 | 2990 | |
| Flt Permitted | | 0.84 | 1.00 | 0.64 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1462 | 1259 | 1100 | 1739 | 1318 | 1711 | 2974 | | 1620 | 2990 | |
| 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) | 64 | 114 | 59 | 73 | 116 | 184 | 51 | 312 | 76 | 117 | 298 | 66 |
| RTOR Reduction (vph) | 0 | 0 | 44 | 0 | 0 | 138 | 0 | 29 | 0 | 0 | 22 | 0 |
| Lane Group Flow (vph) | 0 | 178 | 15 | 73 | 116 | 46 | 51 | 359 | 0 | 117 | 342 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 2.8 | 16.9 | | 7.6 | 21.7 | |
| Effective Green, g (s) | | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 2.8 | 16.9 | | 7.6 | 21.7 | |
| Actuated g/C Ratio | | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.05 | 0.32 | | 0.14 | 0.41 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 366 | 315 | 275 | 435 | 330 | 90 | 953 | | 233 | 1231 | |
| v/s Ratio Prot | | | | | 0.07 | | 0.03 | c0.12 | | c0.07 | c0.11 | |
| v/s Ratio Perm | | c0.12 | 0.01 | 0.07 | | 0.03 | | | | | | |
| v/c Ratio | | 0.49 | 0.05 | 0.27 | 0.27 | 0.14 | 0.57 | 0.38 | | 0.50 | 0.28 | |
| Uniform Delay, d1 | | 16.9 | 15.0 | 15.9 | 15.9 | 15.3 | 24.4 | 13.8 | | 20.8 | 10.3 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.0 | 0.1 | 0.5 | 0.3 | 0.2 | 7.9 | 0.3 | | 1.7 | 0.2 | |
| Delay (s) | | 17.9 | 15.0 | 16.4 | 16.2 | 15.5 | 32.3 | 14.2 | | 22.5 | 10.5 | |
| Level of Service | | B | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 17.2 | | | 15.9 | | | 16.3 | | | 13.4 | |
| Approach LOS | | B | | | B | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 15.4 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.43 | | |
| Actuated Cycle Length (s) | 52.7 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 47.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 24: Merced Street & Fairway Dr

2035 SAT



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 123 | 188 | 71 | 83 | 258 | 78 | 69 | 485 | 87 | 72 | 471 | 107 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3153 | | 1593 | 3136 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3153 | | 1593 | 3136 | |
| 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) | 134 | 204 | 77 | 90 | 280 | 85 | 75 | 527 | 95 | 78 | 512 | 116 |
| RTOR Reduction (vph) | 0 | 0 | 59 | 0 | 0 | 65 | 0 | 10 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 134 | 204 | 18 | 90 | 280 | 20 | 75 | 612 | 0 | 78 | 615 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 15.9 | 27.3 | 27.3 | 15.7 | 27.1 | 27.1 | 9.3 | 44.3 | | 9.7 | 44.7 | |
| Effective Green, g (s) | 15.9 | 27.3 | 27.3 | 15.7 | 27.1 | 27.1 | 9.3 | 44.3 | | 9.7 | 44.7 | |
| Actuated g/C Ratio | 0.14 | 0.24 | 0.24 | 0.14 | 0.23 | 0.23 | 0.08 | 0.38 | | 0.08 | 0.39 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 216 | 434 | 307 | 215 | 435 | 315 | 132 | 1204 | | 133 | 1208 | |
| v/s Ratio Prot | c0.08 | 0.11 | | 0.06 | c0.15 | | 0.05 | c0.19 | | 0.05 | c0.20 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.62 | 0.47 | 0.06 | 0.42 | 0.64 | 0.06 | 0.57 | 0.51 | | 0.59 | 0.51 | |
| Uniform Delay, d1 | 47.2 | 38.1 | 34.4 | 46.0 | 40.1 | 34.6 | 51.4 | 27.5 | | 51.2 | 27.3 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.2 | 1.1 | 0.1 | 1.8 | 3.6 | 0.1 | 6.7 | 1.5 | | 7.6 | 1.0 | |
| Delay (s) | 53.4 | 39.2 | 34.5 | 47.8 | 43.7 | 34.7 | 58.1 | 29.0 | | 58.8 | 28.2 | |
| Level of Service | D | D | C | D | D | C | E | C | | E | C | |
| Approach Delay (s) | | 42.9 | | | 42.8 | | | 32.2 | | | 31.6 | |
| Approach LOS | | D | | | D | | | C | | | C | |
























| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 36.1 | HCM 2000 Level of Service D |
| HCM 2000 Volume to Capacity ratio | 0.58 | |
| Actuated Cycle Length (s) | 116.0 | Sum of lost time (s) 19.0 |
| Intersection Capacity Utilization | 64.1% | ICU Level of Service C |
| Analysis Period (min) | 15 | |

c Critical Lane Group

2035 + Project AM

HCM Signalized Intersection Capacity Analysis
1: Doolittle Dr & Davis St

2035 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 26 | 97 | 34 | 443 | 113 | 928 | 46 | 789 | 423 | 783 | 350 | 44 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3069 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1436 | 3143 | 3175 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3069 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1436 | 3143 | 3175 | | |
| 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) | 28 | 105 | 37 | 482 | 123 | 1009 | 50 | 858 | 460 | 851 | 380 | 48 | |
| RTOR Reduction (vph) | 0 | 32 | 0 | 0 | 0 | 158 | 0 | 0 | 200 | 0 | 7 | 0 | |
| Lane Group Flow (vph) | 28 | 110 | 0 | 482 | 123 | 851 | 50 | 858 | 260 | 851 | 421 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 2.8 | 14.3 | | 17.1 | 28.6 | 55.4 | 16.3 | 24.4 | 41.5 | 26.8 | 34.9 | | |
| Effective Green, g (s) | 2.8 | 14.3 | | 17.1 | 28.6 | 55.4 | 16.3 | 24.4 | 41.5 | 26.8 | 34.9 | | |
| Actuated g/C Ratio | 0.03 | 0.15 | | 0.17 | 0.29 | 0.57 | 0.17 | 0.25 | 0.42 | 0.27 | 0.36 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 47 | 448 | | 568 | 493 | 843 | 269 | 1160 | 608 | 860 | 1131 | | |
| v/s Ratio Prot | 0.02 | 0.04 | | c0.15 | 0.07 | c0.28 | 0.03 | c0.18 | 0.07 | 0.27 | 0.13 | | |
| v/s Ratio Perm | | | | | | 0.29 | | | 0.11 | | | | |
| v/c Ratio | 0.60 | 0.25 | | 0.85 | 0.25 | 1.01 | 0.19 | 0.74 | 0.43 | 0.99 | 0.37 | | |
| Uniform Delay, d1 | 47.0 | 37.0 | | 39.1 | 26.5 | 21.3 | 35.1 | 33.8 | 19.8 | 35.4 | 23.4 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 12.8 | 0.3 | | 10.9 | 0.3 | 33.5 | 0.1 | 2.7 | 0.2 | 27.7 | 0.4 | | |
| Delay (s) | 59.8 | 37.3 | | 50.0 | 26.7 | 54.7 | 35.2 | 36.5 | 20.0 | 63.1 | 23.7 | | |
| Level of Service | E | D | | D | C | D | D | D | C | E | C | | |
| Approach Delay (s) | | 41.0 | | | 51.2 | | | 30.9 | | | 49.9 | | |
| Approach LOS | | D | | | D | | | C | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 44.2 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.93 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 97.9 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 87.7% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

2: Phillips Ln & Davis St

2035 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|-------|-------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 74 | 1218 | 10 | 21 | 1556 | 120 | 24 | 1 | 90 | 91 | 1 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.96 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3174 | | 1620 | 3070 | 1323 | 1678 | 1432 | | 3143 | 1395 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.33 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3174 | | 1620 | 3070 | 1323 | 574 | 1432 | | 3143 | 1395 | |
| 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) | 80 | 1324 | 11 | 23 | 1691 | 130 | 26 | 1 | 98 | 99 | 1 | 58 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 39 | 0 | 87 | 0 | 0 | 50 | 0 |
| Lane Group Flow (vph) | 80 | 1335 | 0 | 23 | 1704 | 78 | 26 | 12 | 0 | 99 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 9.5 | 61.6 | | 4.3 | 56.4 | 70.2 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Effective Green, g (s) | 9.5 | 61.6 | | 4.3 | 56.4 | 70.2 | 12.3 | 12.3 | | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.09 | 0.59 | | 0.04 | 0.54 | 0.67 | 0.12 | 0.12 | | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 146 | 1862 | | 66 | 1649 | 884 | 67 | 167 | | 413 | 183 | |
| v/s Ratio Prot | c0.05 | 0.42 | | 0.01 | c0.55 | 0.01 | | 0.01 | | c0.03 | | |
| v/s Ratio Perm | | | | | | 0.05 | c0.05 | | | | | 0.01 |
| v/c Ratio | 0.55 | 0.72 | | 0.35 | 1.03 | 0.09 | 0.39 | 0.07 | | 0.24 | 0.05 | |
| Uniform Delay, d1 | 45.7 | 15.5 | | 49.0 | 24.3 | 6.1 | 42.9 | 41.3 | | 40.9 | 39.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.27 | 0.59 | 1.38 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 2.4 | | 0.9 | 29.0 | 0.0 | 1.4 | 0.1 | | 0.3 | 0.1 | |
| Delay (s) | 47.9 | 17.9 | | 63.2 | 43.2 | 8.5 | 44.2 | 41.4 | | 41.2 | 40.0 | |
| Level of Service | D | B | | E | D | A | D | D | | D | D | |
| Approach Delay (s) | | 19.6 | | | 41.3 | | | 41.9 | | | 40.7 | |
| Approach LOS | | B | | | D | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 32.6 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.78 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 77.6% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Westgate Pkwy/Warden Ave & Davis St

2035 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|-------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↙ | ↑↑↑ | | ↙↙ | ↑↑↑ | | | ↑ | ↙↙ | ↙ | ↑ | |
| Volume (vph) | 6 | 1345 | 52 | 257 | 1638 | 43 | 65 | 30 | 151 | 119 | 56 | 24 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.91 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.97 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4542 | | 3143 | 4755 | | | 1826 | 2808 | 1562 | 1551 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.74 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4542 | | 3143 | 4755 | | | 1406 | 2808 | 1562 | 1551 | |
| 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) | 7 | 1462 | 57 | 279 | 1780 | 47 | 71 | 33 | 164 | 129 | 61 | 26 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 122 | 0 | 15 | 0 |
| Lane Group Flow (vph) | 7 | 1515 | 0 | 279 | 1825 | 0 | 0 | 104 | 42 | 129 | 72 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 1.0 | 50.9 | | 14.6 | 65.0 | | | 12.2 | 26.8 | 13.8 | 13.8 | |
| Effective Green, g (s) | 1.0 | 50.9 | | 14.6 | 65.0 | | | 12.2 | 26.8 | 13.8 | 13.8 | |
| Actuated g/C Ratio | 0.01 | 0.48 | | 0.14 | 0.62 | | | 0.12 | 0.26 | 0.13 | 0.13 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 15 | 2201 | | 437 | 2943 | | | 163 | 716 | 205 | 203 | |
| v/s Ratio Prot | c0.00 | c0.33 | | 0.09 | c0.38 | | | | 0.01 | c0.08 | 0.05 | |
| v/s Ratio Perm | | | | | | | | c0.07 | 0.01 | | | |
| v/c Ratio | 0.47 | 0.69 | | 0.64 | 0.62 | | | 0.64 | 0.06 | 0.63 | 0.36 | |
| Uniform Delay, d1 | 51.7 | 20.9 | | 42.7 | 12.4 | | | 44.3 | 29.6 | 43.2 | 41.6 | |
| Progression Factor | 0.66 | 0.49 | | 1.16 | 0.87 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.3 | 1.4 | | 0.9 | 0.4 | | | 5.9 | 0.0 | 4.3 | 0.4 | |
| Delay (s) | 40.5 | 11.7 | | 50.3 | 11.1 | | | 50.2 | 29.6 | 47.5 | 41.9 | |
| Level of Service | D | B | | D | B | | | D | C | D | D | |
| Approach Delay (s) | | 11.8 | | | 16.3 | | | 37.6 | | | 45.2 | |
| Approach LOS | | B | | | B | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 17.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 68.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: I-880 SB ramps & Davis St/Davis Street

2035 AM + Project

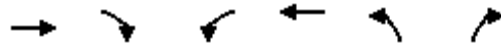


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|--------|------|---------------------------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↖ | ↕ | ↗ |
| Volume (vph) | 0 | 890 | 705 | 0 | 1457 | 410 | 0 | 0 | 0 | 194 | 0 | 517 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.97 | | | | | 1.00 | 0.86 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3123 | | | | | 1681 | 1415 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3123 | | | | | 1681 | 1415 | 1461 |
| 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 | 967 | 766 | 0 | 1584 | 446 | 0 | 0 | 0 | 211 | 0 | 562 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 17 | 17 |
| Lane Group Flow (vph) | 0 | 967 | 766 | 0 | 2009 | 0 | 0 | 0 | 0 | 190 | 274 | 275 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 65.1 | 105.0 | | 65.1 | | | | | 31.9 | 31.9 | 31.9 |
| Effective Green, g (s) | | 65.1 | 105.0 | | 65.1 | | | | | 31.9 | 31.9 | 31.9 |
| Actuated g/C Ratio | | 0.62 | 1.00 | | 0.62 | | | | | 0.30 | 0.30 | 0.30 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2041 | 1439 | | 1936 | | | | | 510 | 429 | 443 |
| v/s Ratio Prot | | 0.29 | | | c0.64 | | | | | 0.11 | c0.19 | 0.19 |
| v/s Ratio Perm | | | 0.53 | | | | | | | | | |
| v/c Ratio | | 0.47 | 0.53 | | 1.04 | | | | | 0.37 | 0.64 | 0.62 |
| Uniform Delay, d1 | | 10.7 | 0.0 | | 20.0 | | | | | 28.7 | 31.6 | 31.4 |
| Progression Factor | | 0.56 | 1.00 | | 0.91 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.6 | 0.3 | | 29.5 | | | | | 0.5 | 3.1 | 2.7 |
| Delay (s) | | 6.6 | 0.3 | | 47.6 | | | | | 29.2 | 34.7 | 34.1 |
| Level of Service | | A | A | | D | | | | | C | C | C |
| Approach Delay (s) | | 3.8 | | | 47.6 | | | 0.0 | | | 33.1 | |
| Approach LOS | | A | | | D | | | A | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 28.4 | | HCM 2000 Level of Service | | | | | C | | |
| HCM 2000 Volume to Capacity ratio | | | 0.91 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | | | | | 8.0 | | |
| Intersection Capacity Utilization | | | 81.4% | | ICU Level of Service | | | | | D | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

2035 AM + Project



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------|------|------|-------|-------|------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↘↘ | ↗ |
| Volume (vph) | 580 | 677 | 0 | 1316 | 525 | 185 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Fr _t | 0.92 | | | 1.00 | 0.99 | 0.85 |
| Fl _t Protected | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3253 | | | 3539 | 3430 | 1441 |
| Fl _t Permitted | 1.00 | | | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3253 | | | 3539 | 3430 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 630 | 736 | 0 | 1430 | 571 | 201 |
| RTOR Reduction (vph) | 136 | 0 | 0 | 0 | 3 | 142 |
| Lane Group Flow (vph) | 1230 | 0 | 0 | 1430 | 588 | 39 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 75.1 | | | 75.1 | 22.9 | 22.9 |
| Effective Green, g (s) | 75.1 | | | 75.1 | 22.9 | 22.9 |
| Actuated g/C Ratio | 0.72 | | | 0.72 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2326 | | | 2531 | 748 | 314 |
| v/s Ratio Prot | 0.38 | | | c0.40 | c0.17 | 0.03 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.53 | | | 0.56 | 0.79 | 0.13 |
| Uniform Delay, d ₁ | 6.8 | | | 7.1 | 38.7 | 33.0 |
| Progression Factor | 0.72 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d ₂ | 0.8 | | | 0.9 | 5.0 | 0.1 |
| Delay (s) | 5.7 | | | 8.1 | 43.8 | 33.1 |
| Level of Service | A | | | A | D | C |
| Approach Delay (s) | 5.7 | | | 8.1 | 41.3 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.4 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.62 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 61.4% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

6: Doolittle Dr & Williams St

2035 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↕ | | ↕ | ↕↕ | |
| Volume (vph) | 104 | 126 | 19 | 80 | 88 | 140 | 24 | 1051 | 84 | 47 | 574 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.99 | |
| Flt Protected | | 0.98 | | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1533 | | | 1691 | 1303 | 1620 | 3038 | | 1562 | 3026 | |
| Flt Permitted | | 0.75 | | | 0.72 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1166 | | | 1253 | 1303 | 1620 | 3038 | | 1562 | 3026 | |
| 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) | 113 | 137 | 21 | 87 | 96 | 152 | 26 | 1142 | 91 | 51 | 624 | 64 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 110 | 0 | 6 | 0 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 0 | 267 | 0 | 0 | 183 | 42 | 26 | 1227 | 0 | 51 | 680 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | 5 | | 2 | 2 | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | |
| Actuated Green, G (s) | | 19.3 | | | 19.3 | 19.3 | 3.2 | 31.5 | | 5.5 | 33.3 | |
| Effective Green, g (s) | | 19.3 | | | 19.3 | 19.3 | 3.2 | 31.5 | | 5.5 | 33.3 | |
| Actuated g/C Ratio | | 0.28 | | | 0.28 | 0.28 | 0.05 | 0.45 | | 0.08 | 0.48 | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | | 323 | | | 347 | 361 | 74 | 1376 | | 123 | 1449 | |
| v/s Ratio Prot | | | | | | | 0.02 | c0.40 | | c0.03 | 0.22 | |
| v/s Ratio Perm | | c0.23 | | | 0.15 | 0.03 | | | | | | |
| v/c Ratio | | 0.83 | | | 0.53 | 0.12 | 0.35 | 0.89 | | 0.41 | 0.47 | |
| Uniform Delay, d1 | | 23.5 | | | 21.2 | 18.7 | 32.1 | 17.4 | | 30.5 | 12.2 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 16.5 | | | 1.9 | 0.2 | 3.9 | 7.8 | | 3.1 | 0.3 | |
| Delay (s) | | 40.1 | | | 23.1 | 18.9 | 36.0 | 25.3 | | 33.5 | 12.5 | |
| Level of Service | | D | | | C | B | D | C | | C | B | |
| Approach Delay (s) | | 40.1 | | | 21.2 | | | 25.5 | | | 13.9 | |
| Approach LOS | | D | | | C | | | C | | | B | |

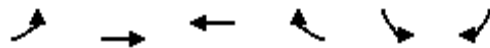
Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 23.2 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.83 | | |
| Actuated Cycle Length (s) | 69.5 | Sum of lost time (s) | 13.7 |
| Intersection Capacity Utilization | 70.6% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

2035 AM + Project



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 29 | 250 | 359 | 183 | 148 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1557 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 32 | 272 | 390 | 199 | 161 | 64 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 54 | 0 | 54 |
| Lane Group Flow (vph) | 32 | 272 | 390 | 145 | 161 | 10 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 4.7 | 84.8 | 76.1 | 76.1 | 16.6 | 16.6 |
| Effective Green, g (s) | 4.7 | 84.8 | 76.1 | 76.1 | 16.6 | 16.6 |
| Actuated g/C Ratio | 0.04 | 0.77 | 0.69 | 0.69 | 0.15 | 0.15 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 69 | 1408 | 1179 | 1077 | 235 | 203 |
| v/s Ratio Prot | c0.02 | 0.15 | c0.23 | | c0.10 | |
| v/s Ratio Perm | | | | 0.09 | | 0.01 |
| v/c Ratio | 0.46 | 0.19 | 0.33 | 0.13 | 0.69 | 0.05 |
| Uniform Delay, d1 | 51.4 | 3.4 | 6.8 | 5.8 | 44.2 | 39.9 |
| Progression Factor | 1.00 | 1.00 | 1.13 | 1.56 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.8 | 0.3 | 0.6 | 0.2 | 8.0 | 0.1 |
| Delay (s) | 53.2 | 3.7 | 8.3 | 9.2 | 52.2 | 40.0 |
| Level of Service | D | A | A | A | D | D |
| Approach Delay (s) | | 8.9 | 8.6 | | 48.8 | |
| Approach LOS | | A | A | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.40 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 40.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis 2035 AM + Project
8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBT | EBR | WBL | WBT | WBR | NBL2 | NBL | NBR | SBT | SEL | SER |
|------------------------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations | ↑ | ↗ | ↖ | ↘ | | | ↖ | ↗ | ↕ | ↘ | ↙ |
| Volume (vph) | 289 | 124 | 199 | 312 | 1 | 271 | 5 | 222 | 7 | 0 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 9 | 10 | 10 | 11 | 11 | 16 | 12 | 12 | 12 |
| Total Lost time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 0.97 | 1.00 | 1.00 | | | 1.00 | 0.97 | 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 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 0.86 | |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | | | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1759 | 1441 | 1562 | 1704 | | | 1678 | 1709 | 1863 | 1580 | |
| 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 |
| Adj. Flow (vph) | 314 | 135 | 216 | 339 | 1 | 295 | 5 | 241 | 8 | 0 | 8 |
| RTOR Reduction (vph) | 0 | 83 | 0 | 0 | 0 | 0 | 0 | 129 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 314 | 52 | 216 | 340 | 0 | 0 | 300 | 112 | 8 | 8 | 0 |
| Confl. Peds. (#/hr) | | 14 | | | | | | 2 | | 2 | |
| Confl. Bikes (#/hr) | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Turn Type | NA | Perm | Prot | NA | | Prot | Prot | Perm | NA | Prot | |
| Protected Phases | 2 | | 1 | 6 | | 4 | 4 | | 8 | 7 | |
| Permitted Phases | | 2 | | | | | | 4 | | | |
| Actuated Green, G (s) | 42.5 | 42.5 | 19.3 | 65.8 | | | 23.8 | 23.8 | 1.4 | 2.4 | |
| Effective Green, g (s) | 42.5 | 42.5 | 19.3 | 65.8 | | | 23.8 | 23.8 | 1.4 | 2.4 | |
| Actuated g/C Ratio | 0.39 | 0.39 | 0.18 | 0.60 | | | 0.22 | 0.22 | 0.01 | 0.02 | |
| Clearance Time (s) | 4.6 | 4.6 | 4.0 | 4.6 | | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 679 | 556 | 274 | 1019 | | | 363 | 369 | 23 | 34 | |
| v/s Ratio Prot | c0.18 | | c0.14 | 0.20 | | | c0.18 | | c0.00 | c0.01 | |
| v/s Ratio Perm | | 0.04 | | | | | | 0.07 | | | |
| v/c Ratio | 0.46 | 0.09 | 0.79 | 0.33 | | | 0.83 | 0.30 | 0.35 | 0.24 | |
| Uniform Delay, d1 | 25.2 | 21.5 | 43.4 | 11.1 | | | 41.1 | 36.2 | 53.8 | 52.9 | |
| Progression Factor | 0.94 | 1.07 | 1.00 | 1.00 | | | 0.71 | 0.52 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 0.3 | 13.9 | 0.9 | | | 12.7 | 0.4 | 8.9 | 3.5 | |
| Delay (s) | 25.8 | 23.2 | 57.3 | 12.0 | | | 42.0 | 19.3 | 62.8 | 56.4 | |
| Level of Service | C | C | E | B | | | D | B | E | E | |
| Approach Delay (s) | 25.0 | | | 29.6 | | | | | 62.8 | 56.4 | |
| Approach LOS | C | | | C | | | | | E | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 29.4 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.62 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 20.6 |
| Intersection Capacity Utilization | 80.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

2035 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | | | ↑ | ↗ | | | ↗ | ↘ | | |
| Volume (veh/h) | 0 | 274 | 5 | 0 | 631 | 14 | 0 | 0 | 15 | 35 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 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 |
| Hourly flow rate (vph) | 0 | 298 | 5 | 0 | 686 | 15 | 0 | 0 | 16 | 38 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 701 | | | 303 | | | 986 | 1002 | 301 | 1003 | 989 | 686 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 701 | | | 303 | | | 986 | 1002 | 301 | 1003 | 989 | 686 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 98 | 82 | 100 | 100 |
| cM capacity (veh/h) | 896 | | | 1258 | | | 227 | 243 | 739 | 216 | 247 | 448 |

















| Direction, Lane # | EB 1 | WB 1 | WB 2 | NB 1 | SB 1 |
|------------------------|------|------|------|------|------|
| Volume Total | 303 | 686 | 15 | 16 | 38 |
| Volume Left | 0 | 0 | 0 | 0 | 38 |
| Volume Right | 5 | 0 | 15 | 16 | 0 |
| cSH | 1700 | 1700 | 1700 | 739 | 216 |
| Volume to Capacity | 0.18 | 0.40 | 0.01 | 0.02 | 0.18 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 2 | 16 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 10.0 | 25.2 |
| Lane LOS | | | | A | D |
| Approach Delay (s) | 0.0 | 0.0 | | 10.0 | 25.2 |
| Approach LOS | | | | A | D |

Intersection Summary

| | |
|-----------------------------------|-------|
| Average Delay | 1.1 |
| Intersection Capacity Utilization | 43.2% |
| ICU Level of Service | A |
| Analysis Period (min) | 15 |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2035 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 46 | 310 | 12 | 28 | 575 | 80 | 15 | 131 | 52 | 46 | 51 | 25 |
| 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 |
| Hourly flow rate (vph) | 50 | 337 | 13 | 30 | 625 | 87 | 16 | 142 | 57 | 50 | 55 | 27 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 400 | 742 | 215 | 133 | | | | | | | | |
| Volume Left (vph) | 50 | 30 | 16 | 50 | | | | | | | | |
| Volume Right (vph) | 13 | 87 | 57 | 27 | | | | | | | | |
| Hadj (s) | 0.04 | -0.03 | -0.11 | -0.01 | | | | | | | | |
| Departure Headway (s) | 6.4 | 6.0 | 7.1 | 7.5 | | | | | | | | |
| Degree Utilization, x | 0.71 | 1.0 | 0.43 | 0.28 | | | | | | | | |
| Capacity (veh/h) | 548 | 600 | 471 | 433 | | | | | | | | |
| Control Delay (s) | 23.4 | 143.7 | 15.3 | 13.4 | | | | | | | | |
| Approach Delay (s) | 23.4 | 143.7 | 15.3 | 13.4 | | | | | | | | |
| Approach LOS | C | F | C | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 81.2 | | | | | | | | | |
| Level of Service | | | F | | | | | | | | | |
| Intersection Capacity Utilization | | | 66.9% | ICU Level of Service | C | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2035 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 136 | 306 | 76 | 158 | 559 | 377 | 13 | 664 | 248 | 223 | 345 | 105 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1449 | 1620 | 1739 | 1391 | 1652 | 3240 | 1331 | 1620 | 2963 | 1900 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1449 | 1620 | 1739 | 1391 | 1652 | 3240 | 1331 | 1620 | 2963 | 1900 | |
| 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) | 148 | 333 | 83 | 172 | 608 | 410 | 14 | 722 | 270 | 242 | 375 | 114 | |
| RTOR Reduction (vph) | 0 | 0 | 66 | 0 | 0 | 186 | 0 | 0 | 92 | 0 | 17 | 0 | |
| Lane Group Flow (vph) | 148 | 333 | 17 | 172 | 608 | 224 | 14 | 722 | 178 | 242 | 472 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 16.9 | 24.6 | 24.6 | 18.4 | 26.1 | 26.1 | 3.1 | 33.9 | 33.9 | 23.8 | 54.6 | | |
| Effective Green, g (s) | 16.9 | 24.6 | 24.6 | 18.4 | 26.1 | 26.1 | 3.1 | 33.9 | 33.9 | 23.8 | 54.6 | | |
| Actuated g/C Ratio | 0.14 | 0.21 | 0.21 | 0.16 | 0.22 | 0.22 | 0.03 | 0.29 | 0.29 | 0.20 | 0.46 | | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 235 | 360 | 300 | 251 | 382 | 305 | 43 | 925 | 380 | 324 | 1362 | | |
| v/s Ratio Prot | 0.09 | 0.19 | | c0.11 | c0.35 | | 0.01 | c0.22 | | c0.15 | 0.16 | | |
| v/s Ratio Perm | | | 0.01 | | | 0.16 | | | 0.13 | | | | |
| v/c Ratio | 0.63 | 0.93 | 0.06 | 0.69 | 1.59 | 0.74 | 0.33 | 0.78 | 0.47 | 0.75 | 0.35 | | |
| Uniform Delay, d1 | 48.0 | 46.1 | 37.7 | 47.4 | 46.3 | 43.1 | 56.8 | 39.0 | 35.0 | 44.6 | 20.6 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 5.9 | 29.3 | 0.1 | 8.1 | 278.4 | 9.5 | 5.9 | 4.6 | 1.2 | 9.6 | 0.2 | | |
| Delay (s) | 53.8 | 75.5 | 37.9 | 55.6 | 324.7 | 52.5 | 62.7 | 43.6 | 36.2 | 54.2 | 20.8 | | |
| Level of Service | D | E | D | E | F | D | E | D | D | D | C | | |
| Approach Delay (s) | | 64.2 | | | 192.0 | | | 41.9 | | | 31.9 | | |
| Approach LOS | | E | | | F | | | D | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 94.6 | | | | | | | | | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | | | 0.98 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 118.7 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 83.0% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

2035 AM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|-------|------|-------|------|-------|------|------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 38 | 711 | 77 | 1060 | 1116 | 237 | 112 | 204 | 590 | 164 | 173 | 33 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 4.0 | 4.0 | 5.5 | 5.5 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4587 | | 3255 | 3146 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4587 | | 3255 | 3146 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 | |
| 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) | 41 | 773 | 84 | 1152 | 1213 | 258 | 122 | 222 | 641 | 178 | 188 | 36 | |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | |
| Lane Group Flow (vph) | 41 | 845 | 0 | 1152 | 1454 | 0 | 122 | 222 | 641 | 178 | 188 | 8 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 6.0 | 21.0 | | 34.0 | 49.0 | | 13.0 | 25.0 | 63.0 | 11.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 6.0 | 21.0 | | 34.0 | 49.0 | | 13.0 | 25.0 | 63.0 | 11.0 | 23.0 | 23.0 | |
| Actuated g/C Ratio | 0.05 | 0.19 | | 0.31 | 0.45 | | 0.12 | 0.23 | 0.57 | 0.10 | 0.21 | 0.21 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 85 | 875 | | 1006 | 1401 | | 198 | 762 | 1549 | 325 | 677 | 307 | |
| v/s Ratio Prot | 0.03 | c0.18 | | c0.35 | c0.46 | | c0.07 | 0.07 | c0.24 | 0.05 | 0.06 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 | |
| v/c Ratio | 0.48 | 0.97 | | 1.15 | 1.04 | | 0.62 | 0.29 | 0.41 | 0.55 | 0.28 | 0.02 | |
| Uniform Delay, d1 | 50.5 | 44.1 | | 38.0 | 30.5 | | 46.1 | 35.2 | 13.2 | 47.1 | 36.5 | 34.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.02 | 0.64 | 0.19 | 1.09 | 0.78 | 1.00 | |
| Incremental Delay, d2 | 5.8 | 23.1 | | 77.2 | 34.5 | | 13.4 | 0.3 | 0.2 | 5.9 | 0.3 | 0.0 | |
| Delay (s) | 56.3 | 67.3 | | 115.2 | 65.0 | | 60.3 | 22.8 | 2.8 | 57.1 | 28.7 | 34.6 | |
| Level of Service | E | E | | F | E | | E | C | A | E | C | C | |
| Approach Delay (s) | | 66.8 | | | 87.1 | | | 14.4 | | | 41.8 | | |
| Approach LOS | | E | | | F | | | B | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 65.1 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 0.88 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 87.0% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2035 AM + Project



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑↑↑ | | ↵ | ↑↑ | | ↵ |
| Volume (vph) | 1285 | 15 | 138 | 0 | 0 | 181 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 1.00 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6397 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6397 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1397 | 16 | 150 | 0 | 0 | 197 |
| RTOR Reduction (vph) | 3 | 0 | 0 | 0 | 0 | 32 |
| Lane Group Flow (vph) | 1410 | 0 | 150 | 0 | 0 | 165 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 21.0 | | 6.0 | | | 6.0 |
| Effective Green, g (s) | 21.0 | | 6.0 | | | 6.0 |
| Actuated g/C Ratio | 0.58 | | 0.16 | | | 0.16 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 3680 | | 290 | | | 264 |
| v/s Ratio Prot | c0.22 | | 0.08 | | | c0.10 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.38 | | 0.52 | | | 0.63 |
| Uniform Delay, d1 | 4.2 | | 13.9 | | | 14.2 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.1 | | 1.6 | | | 4.6 |
| Delay (s) | 4.3 | | 15.5 | | | 18.8 |
| Level of Service | A | | B | | | B |
| Approach Delay (s) | 4.3 | | | 15.5 | 18.8 | |
| Approach LOS | A | | | B | B | |

Intersection Summary

| | | | |
|--|-------|---------------------------|-----|
| HCM 2000 Control Delay | 6.9 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.44 | | |
| Actuated Cycle Length (s) | 36.5 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 38.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| Description: WBT Removed as they are not part of signalized intersection | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|------|------|------|------|-------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1089 | 599 | 396 | 1550 | 0 | 0 | 0 | 458 | 0 | 0 | 1116 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 1184 | 651 | 430 | 1685 | 0 | 0 | 0 | 498 | 0 | 0 | 1213 |
| RTOR Reduction (vph) | 0 | 0 | 388 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| Lane Group Flow (vph) | 0 | 1184 | 263 | 430 | 1685 | 0 | 0 | 0 | 498 | 0 | 0 | 1162 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 35.8 | 35.8 | 12.9 | 55.7 | | | | 26.5 | | | 26.5 |
| Effective Green, g (s) | | 35.8 | 35.8 | 12.9 | 55.7 | | | | 26.5 | | | 26.5 |
| Actuated g/C Ratio | | 0.40 | 0.40 | 0.15 | 0.63 | | | | 0.30 | | | 0.30 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1354 | 1066 | 457 | 2106 | | | | 870 | | | 832 |
| v/s Ratio Prot | | 0.35 | | c0.14 | c0.50 | | | | 0.17 | | | c0.42 |
| v/s Ratio Perm | | | 0.10 | | | | | | | | | |
| v/c Ratio | | 0.87 | 0.25 | 0.94 | 0.80 | | | | 0.57 | | | 1.40 |
| Uniform Delay, d1 | | 24.4 | 17.5 | 37.5 | 12.3 | | | | 26.3 | | | 31.1 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 6.6 | 0.1 | 27.7 | 2.3 | | | | 0.9 | | | 185.7 |
| Delay (s) | | 30.9 | 17.6 | 65.3 | 14.6 | | | | 27.2 | | | 216.8 |
| Level of Service | | C | B | E | B | | | | C | | | F |
| Approach Delay (s) | | 26.2 | | | 24.9 | | | 27.2 | | | 216.8 | |
| Approach LOS | | C | | | C | | | C | | | F | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 66.7 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.08 | | |
| Actuated Cycle Length (s) | 88.7 | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | 89.0% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

2035 AM + Project



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|-------|------|------|------|
| Lane Configurations | ↖ | ↗↗↗ | ↖↖ | ↗ | | |
| Volume (vph) | 572 | 0 | 1062 | 492 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 622 | 0 | 1154 | 535 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 113 | 0 | 0 |
| Lane Group Flow (vph) | 622 | 0 | 1154 | 422 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 26.4 | | 24.5 | 24.5 | | |
| Effective Green, g (s) | 26.4 | | 24.5 | 24.5 | | |
| Actuated g/C Ratio | 0.44 | | 0.41 | 0.41 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 713 | | 1372 | 626 | | |
| v/s Ratio Prot | c0.38 | | c0.34 | | | |
| v/s Ratio Perm | | | | 0.28 | | |
| v/c Ratio | 0.87 | | 0.84 | 0.67 | | |
| Uniform Delay, d1 | 15.2 | | 15.9 | 14.4 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 11.4 | | 4.8 | 2.9 | | |
| Delay (s) | 26.6 | | 20.8 | 17.3 | | |
| Level of Service | C | | C | B | | |
| Approach Delay (s) | | 26.6 | 19.7 | | 0.0 | |
| Approach LOS | | C | B | | A | |

| Intersection Summary | | | |
|-----------------------------------|--|-------|-----------------------------|
| HCM 2000 Control Delay | | 21.5 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | | 0.86 | |
| Actuated Cycle Length (s) | | 59.9 | Sum of lost time (s) 9.0 |
| Intersection Capacity Utilization | | 69.7% | ICU Level of Service C |
| Analysis Period (min) | | 15 | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd
























2035 AM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|-------|------|-------|---------------------------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 175 | 882 | 415 | 136 | 1181 | 43 | 200 | 35 | 72 | 18 | 85 | 137 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1531 | 1678 | 4626 | | 1539 | 1565 | 1513 | | 1750 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.97 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1531 | 1678 | 4626 | | 1539 | 1565 | 1513 | | 1750 | 1489 |
| 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) | 190 | 959 | 451 | 148 | 1284 | 47 | 217 | 38 | 78 | 20 | 92 | 149 |
| RTOR Reduction (vph) | 0 | 0 | 255 | 0 | 4 | 0 | 0 | 0 | 64 | 0 | 0 | 138 |
| Lane Group Flow (vph) | 190 | 959 | 196 | 148 | 1327 | 0 | 126 | 129 | 14 | 0 | 112 | 11 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 17.9 | 41.2 | 41.2 | 11.2 | 34.5 | | 16.6 | 16.6 | 16.6 | | 6.8 | 6.8 |
| Effective Green, g (s) | 17.9 | 41.2 | 41.2 | 11.2 | 34.5 | | 16.6 | 16.6 | 16.6 | | 6.8 | 6.8 |
| Actuated g/C Ratio | 0.19 | 0.43 | 0.43 | 0.12 | 0.36 | | 0.17 | 0.17 | 0.17 | | 0.07 | 0.07 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 305 | 2018 | 663 | 197 | 1679 | | 268 | 273 | 264 | | 125 | 106 |
| v/s Ratio Prot | c0.12 | 0.21 | | 0.09 | c0.29 | | 0.08 | c0.08 | | | c0.06 | 0.01 |
| v/s Ratio Perm | | | 0.13 | | | | | | 0.01 | | | |
| v/c Ratio | 0.62 | 0.48 | 0.30 | 0.75 | 0.79 | | 0.47 | 0.47 | 0.05 | | 0.90 | 0.10 |
| Uniform Delay, d1 | 35.4 | 19.2 | 17.5 | 40.6 | 27.0 | | 35.2 | 35.3 | 32.6 | | 43.7 | 41.2 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.71 | 0.60 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 4.4 | 0.8 | 1.1 | 12.4 | 3.0 | | 1.8 | 1.8 | 0.1 | | 50.5 | 0.6 |
| Delay (s) | 39.9 | 20.0 | 18.6 | 41.1 | 19.2 | | 37.0 | 37.0 | 32.8 | | 94.2 | 41.8 |
| Level of Service | D | B | B | D | B | | D | D | C | | F | D |
| Approach Delay (s) | | 22.0 | | | 21.4 | | | 36.0 | | | 64.3 | |
| Approach LOS | | C | | | C | | | D | | | E | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 26.0 | | | HCM 2000 Level of Service | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.69 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | | | Sum of lost time (s) | | | 19.2 | | | |
| Intersection Capacity Utilization | | | 59.6% | | | ICU Level of Service | | | B | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 17: Alvarado St & Marina Blvd

2035 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  | |  |  |  |  |  |  |
| Volume (vph) | 54 | 590 | 224 | 354 | 987 | 14 | 271 | 178 | 433 | 20 | 163 | 43 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3282 | | 3143 | 3240 | 1661 | 3204 | 3124 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3282 | | 3143 | 3240 | 1661 | 3204 | 3124 | |
| 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) | 59 | 641 | 243 | 385 | 1073 | 15 | 295 | 193 | 471 | 22 | 177 | 47 |
| RTOR Reduction (vph) | 0 | 0 | 185 | 0 | 1 | 0 | 0 | 0 | 328 | 0 | 28 | 0 |
| Lane Group Flow (vph) | 59 | 641 | 58 | 385 | 1087 | 0 | 295 | 193 | 143 | 22 | 196 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 5.2 | 22.5 | 22.5 | 24.7 | 42.0 | | 17.0 | 28.2 | 28.2 | 1.6 | 13.2 | |
| Effective Green, g (s) | 5.2 | 22.5 | 22.5 | 24.7 | 42.0 | | 17.0 | 28.2 | 28.2 | 1.6 | 13.2 | |
| Actuated g/C Ratio | 0.05 | 0.24 | 0.24 | 0.26 | 0.44 | | 0.18 | 0.30 | 0.30 | 0.02 | 0.14 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 88 | 782 | 355 | 429 | 1450 | | 562 | 961 | 493 | 53 | 434 | |
| v/s Ratio Prot | 0.04 | 0.19 | | c0.23 | c0.33 | | c0.09 | 0.06 | | 0.01 | c0.06 | |
| v/s Ratio Perm | | | 0.04 | | | | | | 0.09 | | | |
| v/c Ratio | 0.67 | 0.82 | 0.16 | 0.90 | 0.75 | | 0.52 | 0.20 | 0.29 | 0.42 | 0.45 | |
| Uniform Delay, d1 | 44.1 | 34.3 | 28.8 | 33.9 | 22.1 | | 35.3 | 25.0 | 25.7 | 46.2 | 37.6 | |
| Progression Factor | 0.91 | 1.04 | 3.44 | 1.06 | 0.79 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 13.3 | 8.6 | 0.9 | 2.6 | 0.3 | | 1.2 | 0.1 | 0.4 | 7.0 | 1.0 | |
| Delay (s) | 53.6 | 44.2 | 99.8 | 38.8 | 17.8 | | 36.5 | 25.1 | 26.2 | 53.3 | 38.6 | |
| Level of Service | D | D | F | D | B | | D | C | C | D | D | |
| Approach Delay (s) | | 59.1 | | | 23.2 | | | 29.1 | | | 39.9 | |
| Approach LOS | | E | | | C | | | C | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 35.3 | | | HCM 2000 Level of Service | | D | | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.72 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | Sum of lost time (s) | | 18.0 | | | | | | |
| Intersection Capacity Utilization | | | 65.0% | ICU Level of Service | | C | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2035 AM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|--------|------|-------|---------------------------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 443 | 253 | 332 | 5 | 463 | 69 | 456 | 1090 | 7 | 88 | 788 | 458 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1738 | 1480 | 1652 | 3535 | | 1652 | 3100 | |
| Flt Permitted | 0.16 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 273 | 1739 | 1770 | | 1733 | 1480 | 1652 | 3535 | | 1652 | 3100 | |
| 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) | 482 | 275 | 361 | 5 | 503 | 75 | 496 | 1185 | 8 | 96 | 857 | 498 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 1 | 0 | 0 | 88 | 0 |
| Lane Group Flow (vph) | 482 | 275 | 361 | 0 | 508 | 17 | 496 | 1192 | 0 | 96 | 1267 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 14 | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 40.0 | 40.0 | 95.0 | | 21.5 | 21.5 | 21.0 | 32.4 | | 8.1 | 19.0 | |
| Effective Green, g (s) | 40.0 | 40.0 | 95.0 | | 21.5 | 21.5 | 21.0 | 32.4 | | 8.1 | 19.0 | |
| Actuated g/C Ratio | 0.42 | 0.42 | 1.00 | | 0.23 | 0.23 | 0.22 | 0.34 | | 0.09 | 0.20 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 325 | 732 | 1770 | | 392 | 334 | 365 | 1205 | | 140 | 620 | |
| v/s Ratio Prot | c0.23 | 0.16 | | | | | c0.30 | 0.34 | | 0.06 | c0.41 | |
| v/s Ratio Perm | c0.40 | | 0.20 | | 0.29 | 0.01 | | | | | | |
| v/c Ratio | 1.48 | 0.38 | 0.20 | | 1.30 | 0.05 | 1.36 | 0.99 | | 0.69 | 2.04 | |
| Uniform Delay, d1 | 25.8 | 18.9 | 0.0 | | 36.8 | 28.8 | 37.0 | 31.1 | | 42.2 | 38.0 | |
| Progression Factor | 0.55 | 0.53 | 1.00 | | 1.00 | 1.00 | 1.09 | 0.77 | | 0.94 | 0.94 | |
| Incremental Delay, d2 | 229.8 | 0.3 | 0.2 | | 150.9 | 0.1 | 178.1 | 23.2 | | 12.9 | 475.2 | |
| Delay (s) | 244.0 | 10.4 | 0.2 | | 187.7 | 28.9 | 218.5 | 47.2 | | 52.5 | 510.9 | |
| Level of Service | F | B | A | | F | C | F | D | | D | F | |
| Approach Delay (s) | | 107.8 | | | 167.2 | | | 97.5 | | | 480.5 | |
| Approach LOS | | F | | | F | | | F | | | F | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 223.1 | | | HCM 2000 Level of Service | | | F | | | |
| HCM 2000 Volume to Capacity ratio | | | 1.63 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | | | Sum of lost time (s) | | | 19.0 | | | |
| Intersection Capacity Utilization | | | 127.4% | | | ICU Level of Service | | | H | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

2035 AM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 118 | 48 | 131 | 68 | 116 | 495 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 128 | 52 | 142 | 74 | 126 | 538 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 180 | 216 | 664 | | | |
| Volume Left (vph) | 128 | 142 | 0 | | | |
| Volume Right (vph) | 52 | 0 | 538 | | | |
| Hadj (s) | 0.00 | 0.17 | -0.45 | | | |
| Departure Headway (s) | 5.9 | 5.4 | 4.3 | | | |
| Degree Utilization, x | 0.30 | 0.32 | 0.80 | | | |
| Capacity (veh/h) | 566 | 633 | 817 | | | |
| Control Delay (s) | 11.3 | 11.0 | 22.1 | | | |
| Approach Delay (s) | 11.3 | 11.0 | 22.1 | | | |
| Approach LOS | B | B | C | | | |
| Intersection Summary | | | | | | |
| Delay | | | 18.0 | | | |
| Level of Service | | | C | | | |
| Intersection Capacity Utilization | | | 66.9% | ICU Level of Service | C | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

2035 AM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 23 | 9 | 20 | 171 | 142 | 16 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 25 | 10 | 22 | 186 | 154 | 17 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 35 | 208 | 172 | | | |
| Volume Left (vph) | 25 | 22 | 0 | | | |
| Volume Right (vph) | 10 | 0 | 17 | | | |
| Hadj (s) | 0.01 | 0.05 | -0.03 | | | |
| Departure Headway (s) | 4.7 | 4.2 | 4.2 | | | |
| Degree Utilization, x | 0.05 | 0.24 | 0.20 | | | |
| Capacity (veh/h) | 696 | 836 | 848 | | | |
| Control Delay (s) | 8.0 | 8.6 | 8.2 | | | |
| Approach Delay (s) | 8.0 | 8.6 | 8.2 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.4 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 31.9% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive


















2035 AM + Project



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|-------|-------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 71 | 144 | 70 | 42 | 56 | 94 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 77 | 157 | 76 | 46 | 61 | 102 |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 234 | 122 | 163 | | | |
| Volume Left (vph) | 77 | 0 | 61 | | | |
| Volume Right (vph) | 157 | 46 | 0 | | | |
| Hadj (s) | -0.30 | -0.19 | 0.11 | | | |
| Departure Headway (s) | 4.3 | 4.4 | 4.7 | | | |
| Degree Utilization, x | 0.28 | 0.15 | 0.21 | | | |
| Capacity (veh/h) | 792 | 760 | 723 | | | |
| Control Delay (s) | 8.9 | 8.2 | 9.0 | | | |
| Approach Delay (s) | 8.9 | 8.2 | 9.0 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.8 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 34.2% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2035 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | | |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | | Stop |
| Volume (vph) | 13 | 208 | 12 | 14 | 212 | 35 | 16 | 62 | 46 | 31 | 17 | 9 |
| 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 |
| Hourly flow rate (vph) | 14 | 226 | 13 | 15 | 230 | 38 | 17 | 67 | 50 | 34 | 18 | 10 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 14 | 239 | 284 | 135 | 62 | | | | | | | |
| Volume Left (vph) | 14 | 0 | 15 | 17 | 34 | | | | | | | |
| Volume Right (vph) | 0 | 13 | 38 | 50 | 10 | | | | | | | |
| Hadj (s) | 0.53 | 0.00 | -0.04 | -0.16 | 0.05 | | | | | | | |
| Departure Headway (s) | 5.9 | 5.3 | 4.9 | 5.2 | 5.5 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.35 | 0.38 | 0.19 | 0.09 | | | | | | | |
| Capacity (veh/h) | 591 | 648 | 708 | 619 | 576 | | | | | | | |
| Control Delay (s) | 7.8 | 10.0 | 10.8 | 9.4 | 9.1 | | | | | | | |
| Approach Delay (s) | 9.9 | | 10.8 | 9.4 | 9.1 | | | | | | | |
| Approach LOS | A | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.1 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 41.1% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
23: Doolittle Dr & Fairway Drive/Fairway Dr

2035 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↖ | ↗ | ↖ | ↗ | ↖ | ↖ | ↖↗ | | ↖ | ↖↗ | |
| Volume (vph) | 97 | 121 | 71 | 47 | 141 | 227 | 98 | 526 | 48 | 143 | 354 | 37 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.99 | |
| Flt Protected | | 0.98 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1695 | 1260 | 1620 | 1739 | 1317 | 1711 | 3034 | | 1620 | 3032 | |
| Flt Permitted | | 0.79 | 1.00 | 0.56 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1361 | 1260 | 961 | 1739 | 1317 | 1711 | 3034 | | 1620 | 3032 | |
| 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) | 105 | 132 | 77 | 51 | 153 | 247 | 107 | 572 | 52 | 155 | 385 | 40 |
| RTOR Reduction (vph) | 0 | 0 | 55 | 0 | 0 | 178 | 0 | 10 | 0 | 0 | 11 | 0 |
| Lane Group Flow (vph) | 0 | 237 | 22 | 51 | 153 | 69 | 107 | 614 | 0 | 155 | 414 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 16.1 | 16.1 | 16.1 | 16.1 | 16.1 | 7.4 | 17.2 | | 9.0 | 18.8 | |
| Effective Green, g (s) | | 16.1 | 16.1 | 16.1 | 16.1 | 16.1 | 7.4 | 17.2 | | 9.0 | 18.8 | |
| Actuated g/C Ratio | | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.13 | 0.30 | | 0.16 | 0.33 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 382 | 354 | 270 | 488 | 370 | 220 | 910 | | 254 | 994 | |
| v/s Ratio Prot | | | | | 0.09 | | 0.06 | c0.20 | | c0.10 | 0.14 | |
| v/s Ratio Perm | | c0.17 | 0.02 | 0.05 | | 0.05 | | | | | | |
| v/c Ratio | | 0.62 | 0.06 | 0.19 | 0.31 | 0.19 | 0.49 | 0.67 | | 0.61 | 0.42 | |
| Uniform Delay, d1 | | 17.9 | 15.1 | 15.6 | 16.2 | 15.6 | 23.2 | 17.6 | | 22.5 | 15.0 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 3.1 | 0.1 | 0.3 | 0.4 | 0.2 | 1.7 | 2.2 | | 4.3 | 0.4 | |
| Delay (s) | | 21.1 | 15.1 | 16.0 | 16.6 | 15.9 | 24.9 | 19.8 | | 26.8 | 15.4 | |
| Level of Service | | C | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 19.6 | | | 16.1 | | | 20.5 | | | 18.4 | |
| Approach LOS | | B | | | B | | | C | | | B | |

























Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 18.8 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 57.3 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 65.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Merced Street & Fairway Dr

2035 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 128 | 187 | 54 | 185 | 317 | 55 | 120 | 566 | 173 | 72 | 486 | 90 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3109 | | 1593 | 3148 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3109 | | 1593 | 3148 | |
| 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) | 139 | 203 | 59 | 201 | 345 | 60 | 130 | 615 | 188 | 78 | 528 | 98 |
| RTOR Reduction (vph) | 0 | 0 | 47 | 0 | 0 | 45 | 0 | 25 | 0 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 139 | 203 | 12 | 201 | 345 | 15 | 130 | 778 | 0 | 78 | 612 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 13.8 | 22.1 | 22.1 | 18.4 | 26.7 | 26.7 | 19.3 | 42.6 | | 7.9 | 31.2 | |
| Effective Green, g (s) | 13.8 | 22.1 | 22.1 | 18.4 | 26.7 | 26.7 | 19.3 | 42.6 | | 7.9 | 31.2 | |
| Actuated g/C Ratio | 0.13 | 0.20 | 0.20 | 0.17 | 0.24 | 0.24 | 0.18 | 0.39 | | 0.07 | 0.28 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 197 | 370 | 262 | 266 | 452 | 328 | 289 | 1204 | | 114 | 892 | |
| v/s Ratio Prot | 0.09 | 0.11 | | c0.13 | c0.19 | | 0.08 | c0.25 | | 0.05 | c0.19 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | | | | |
| v/c Ratio | 0.71 | 0.55 | 0.05 | 0.76 | 0.76 | 0.04 | 0.45 | 0.65 | | 0.68 | 0.69 | |
| Uniform Delay, d1 | 46.2 | 39.5 | 35.4 | 43.7 | 38.7 | 31.9 | 40.6 | 27.5 | | 49.8 | 35.0 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 0.92 | | 0.91 | 0.41 | |
| Incremental Delay, d2 | 11.7 | 2.1 | 0.1 | 12.2 | 7.9 | 0.1 | 1.5 | 2.6 | | 16.2 | 4.1 | |
| Delay (s) | 57.8 | 41.6 | 35.5 | 55.9 | 46.6 | 32.0 | 39.3 | 27.9 | | 61.5 | 18.3 | |
| Level of Service | E | D | D | E | D | C | D | C | | E | B | |
| Approach Delay (s) | | 46.3 | | | 48.3 | | | 29.5 | | | 23.1 | |
| Approach LOS | | D | | | D | | | C | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 34.7 | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.75 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 69.8% | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

2035 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|------|------|--------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 71 | 306 | 7 | 6 | 494 | 309 | 2 | 0 | 0 | 61 | 0 | 40 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | | 1.00 |
| Frt | 1.00 | 1.00 | | | 0.94 | | | 1.00 | | 1.00 | | 0.85 |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.95 | | 0.95 | | 1.00 |
| Satd. Flow (prot) | 1770 | 1856 | | | 3335 | | | 1770 | | 1770 | | 1583 |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.95 | | 0.76 | | 1.00 |
| Satd. Flow (perm) | 1770 | 1856 | | | 3178 | | | 1770 | | 1409 | | 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) | 77 | 333 | 8 | 7 | 537 | 336 | 2 | 0 | 0 | 66 | 0 | 43 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 132 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| Lane Group Flow (vph) | 77 | 340 | 0 | 0 | 748 | 0 | 0 | 2 | 0 | 66 | 0 | 6 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | |
| Permitted Phases | | | | | | | 8 | | | 4 | | 4 |
| Actuated Green, G (s) | 4.1 | 37.3 | | | 28.3 | | | 6.9 | | 6.9 | | 6.9 |
| Effective Green, g (s) | 4.1 | 37.3 | | | 28.3 | | | 6.9 | | 6.9 | | 6.9 |
| Actuated g/C Ratio | 0.08 | 0.70 | | | 0.53 | | | 0.13 | | 0.13 | | 0.13 |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Grp Cap (vph) | 136 | 1303 | | | 1693 | | | 230 | | 183 | | 205 |
| v/s Ratio Prot | c0.04 | 0.18 | | | | | | | | | | |
| v/s Ratio Perm | | | | | c0.24 | | | 0.00 | | c0.05 | | 0.00 |
| v/c Ratio | 0.57 | 0.26 | | | 1.19dr | | | 0.01 | | 0.36 | | 0.03 |
| Uniform Delay, d1 | 23.6 | 2.9 | | | 7.6 | | | 20.1 | | 21.1 | | 20.2 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | | 1.00 |
| Incremental Delay, d2 | 3.2 | 0.1 | | | 0.3 | | | 0.0 | | 1.7 | | 0.1 |
| Delay (s) | 26.8 | 3.0 | | | 7.8 | | | 20.1 | | 22.7 | | 20.2 |
| Level of Service | C | A | | | A | | | C | | C | | C |
| Approach Delay (s) | | 7.4 | | | 7.8 | | | 20.1 | | | 21.8 | |
| Approach LOS | | A | | | A | | | C | | | C | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 8.8 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.44 | | |
| Actuated Cycle Length (s) | 53.1 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 55.1% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 26: Miller St & Fairway Dr/Aladdin Ave

2035 AM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 63 | 323 | 31 | 78 | 861 | 310 | 12 | 1 | 12 | 61 | 3 | 32 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.96 | | 1.00 | 0.86 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1834 | | 1593 | 1908 | | 1711 | 1550 | | 1770 | 1605 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1834 | | 1593 | 1908 | | 1801 | 1550 | | 1770 | 1605 | |
| 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) | 68 | 351 | 34 | 85 | 936 | 337 | 13 | 1 | 13 | 66 | 3 | 35 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 12 | 0 | 0 | 29 | 0 |
| Lane Group Flow (vph) | 68 | 383 | 0 | 85 | 1265 | 0 | 13 | 2 | 0 | 66 | 9 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 4.4 | 38.6 | | 7.2 | 41.4 | | 3.1 | 3.1 | | 4.4 | 11.5 | |
| Effective Green, g (s) | 4.4 | 38.6 | | 7.2 | 41.4 | | 3.1 | 3.1 | | 4.4 | 11.5 | |
| Actuated g/C Ratio | 0.06 | 0.54 | | 0.10 | 0.58 | | 0.04 | 0.04 | | 0.06 | 0.16 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 109 | 995 | | 161 | 1110 | | 78 | 67 | | 109 | 259 | |
| v/s Ratio Prot | 0.04 | 0.21 | | c0.05 | c0.66 | | | 0.00 | | c0.04 | 0.01 | |
| v/s Ratio Perm | | | | | | | c0.01 | | | | | |
| v/c Ratio | 0.62 | 0.38 | | 0.53 | 1.14 | | 0.17 | 0.02 | | 0.61 | 0.03 | |
| Uniform Delay, d1 | 32.5 | 9.4 | | 30.3 | 14.8 | | 32.8 | 32.6 | | 32.5 | 25.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.8 | 0.3 | | 1.4 | 74.1 | | 1.4 | 0.2 | | 6.4 | 0.1 | |
| Delay (s) | 40.3 | 9.7 | | 31.8 | 88.9 | | 34.1 | 32.7 | | 38.9 | 25.2 | |
| Level of Service | D | A | | C | F | | C | C | | D | C | |
| Approach Delay (s) | | 14.3 | | | 85.4 | | | 33.4 | | | 33.9 | |
| Approach LOS | | B | | | F | | | C | | | C | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 65.3 | HCM 2000 Level of Service E |
| HCM 2000 Volume to Capacity ratio | 1.01 | |
| Actuated Cycle Length (s) | 71.1 | Sum of lost time (s) 17.8 |
| Intersection Capacity Utilization | 82.3% | ICU Level of Service E |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 27: Teagarden St & Aladdin Ave

2035 AM + Project


























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|-------|------|-------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 43 | 284 | 65 | 13 | 805 | 40 | 149 | 111 | 11 | 75 | 152 | 216 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 0.91 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1966 | | 1711 | 1709 | | 1652 | 1833 | | 1644 | 1733 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.34 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1966 | | 1711 | 1709 | | 598 | 1833 | | 1162 | 1733 | |
| 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) | 47 | 309 | 71 | 14 | 875 | 43 | 162 | 121 | 12 | 82 | 165 | 235 |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 68 | 0 |
| Lane Group Flow (vph) | 47 | 369 | 0 | 14 | 916 | 0 | 162 | 128 | 0 | 82 | 332 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 5.1 | 27.6 | | 1.4 | 23.9 | | 21.6 | 21.6 | | 21.6 | 21.6 | |
| Effective Green, g (s) | 5.1 | 27.6 | | 1.4 | 23.9 | | 21.6 | 21.6 | | 21.6 | 21.6 | |
| Actuated g/C Ratio | 0.08 | 0.43 | | 0.02 | 0.38 | | 0.34 | 0.34 | | 0.34 | 0.34 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 137 | 853 | | 37 | 642 | | 203 | 622 | | 394 | 588 | |
| v/s Ratio Prot | c0.03 | c0.19 | | 0.01 | c0.54 | | | 0.07 | | | 0.19 | |
| v/s Ratio Perm | | | | | | | c0.27 | | | 0.07 | | |
| v/c Ratio | 0.34 | 0.43 | | 0.38 | 1.43 | | 0.80 | 0.21 | | 0.21 | 0.56 | |
| Uniform Delay, d1 | 27.7 | 12.5 | | 30.7 | 19.9 | | 19.0 | 14.9 | | 14.9 | 17.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.0 | 0.5 | | 8.6 | 200.7 | | 20.2 | 0.2 | | 0.4 | 1.5 | |
| Delay (s) | 29.7 | 13.0 | | 39.3 | 220.5 | | 39.3 | 15.1 | | 15.3 | 18.7 | |
| Level of Service | C | B | | D | F | | D | B | | B | B | |
| Approach Delay (s) | | 14.9 | | | 217.8 | | | 28.4 | | | 18.1 | |
| Approach LOS | | B | | | F | | | C | | | B | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 106.0 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 1.04 | F |
| Actuated Cycle Length (s) | 63.6 | Sum of lost time (s) |
| Intersection Capacity Utilization | 85.6% | 13.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | E |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Alvarado St & Aladdin Ave

2035 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  | |  |  |  |  |  |  |  |
| Volume (vph) | 204 | 17 | 94 | 2 | 12 | 10 | 594 | 765 | 15 | 7 | 341 | 282 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.87 | | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 1539 | | 1652 | 1602 | | 1652 | 3240 | 1438 | 1711 | 3155 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 1539 | | 1652 | 1602 | | 1652 | 3240 | 1438 | 1711 | 3155 | | |
| 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) | 222 | 18 | 102 | 2 | 13 | 11 | 646 | 832 | 16 | 8 | 371 | 307 | |
| RTOR Reduction (vph) | 0 | 77 | 0 | 0 | 10 | 0 | 0 | 0 | 6 | 0 | 109 | 0 | |
| Lane Group Flow (vph) | 222 | 43 | 0 | 2 | 14 | 0 | 646 | 832 | 10 | 8 | 569 | 0 | |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% | |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | | |
| Permitted Phases | | | | | | | | | 8 | | | | |
| Actuated Green, G (s) | 16.1 | 30.0 | | 0.7 | 14.6 | | 46.2 | 72.8 | 72.8 | 0.7 | 27.3 | | |
| Effective Green, g (s) | 16.1 | 30.0 | | 0.7 | 14.6 | | 46.2 | 72.8 | 72.8 | 0.7 | 27.3 | | |
| Actuated g/C Ratio | 0.13 | 0.25 | | 0.01 | 0.12 | | 0.38 | 0.60 | 0.60 | 0.01 | 0.23 | | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| Lane Grp Cap (vph) | 220 | 382 | | 9 | 193 | | 632 | 1954 | 867 | 9 | 713 | | |
| v/s Ratio Prot | c0.13 | c0.03 | | 0.00 | 0.01 | | c0.39 | 0.26 | | 0.00 | c0.18 | | |
| v/s Ratio Perm | | | | | | | | | 0.01 | | | | |
| v/c Ratio | 1.01 | 0.11 | | 0.22 | 0.07 | | 1.02 | 0.43 | 0.01 | 0.89 | 0.80 | | |
| Uniform Delay, d1 | 52.3 | 35.1 | | 59.7 | 47.1 | | 37.2 | 12.8 | 9.6 | 60.0 | 44.1 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 63.0 | 0.3 | | 24.6 | 0.3 | | 41.5 | 0.3 | 0.0 | 240.9 | 7.1 | | |
| Delay (s) | 115.3 | 35.3 | | 84.3 | 47.4 | | 78.8 | 13.1 | 9.6 | 300.9 | 51.2 | | |
| Level of Service | F | D | | F | D | | E | B | A | F | D | | |
| Approach Delay (s) | | 87.3 | | | 50.2 | | | 41.5 | | | 54.1 | | |
| Approach LOS | | F | | | D | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 51.1 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.84 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.7 | | | | | | | | | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | | | 80.1% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

2035 AM + Project























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↕↕ | | ↕ | ↕↕ | |
| Volume (vph) | 3 | 2 | 0 | 5 | 0 | 15 | 4 | 919 | 7 | 46 | 1259 | 5 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1808 | | | 1562 | 1397 | 1650 | 4947 | | 1617 | 3469 | |
| Flt Permitted | | 0.86 | | | 0.75 | 1.00 | 0.18 | 1.00 | | 0.27 | 1.00 | |
| Satd. Flow (perm) | | 1606 | | | 1241 | 1397 | 321 | 4947 | | 464 | 3469 | |
| 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) | 3 | 2 | 0 | 5 | 0 | 16 | 4 | 999 | 8 | 50 | 1368 | 5 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 5 | 0 | 0 | 5 | 1 | 4 | 1007 | 0 | 50 | 1373 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Effective Green, g (s) | | 7.1 | | | 7.1 | 7.1 | 94.3 | 94.3 | | 94.3 | 94.3 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | 0.06 | 0.86 | 0.86 | | 0.86 | 0.86 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 103 | | | 80 | 90 | 275 | 4240 | | 397 | 2973 | |
| v/s Ratio Prot | | | | | | | | 0.20 | | | c0.40 | |
| v/s Ratio Perm | | 0.00 | | | c0.00 | 0.00 | 0.01 | | | 0.11 | | |
| v/c Ratio | | 0.05 | | | 0.06 | 0.01 | 0.01 | 0.24 | | 0.13 | 0.46 | |
| Uniform Delay, d1 | | 48.3 | | | 48.3 | 48.2 | 1.1 | 1.4 | | 1.3 | 1.9 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.40 | 0.32 | | 0.05 | 0.53 | |
| Incremental Delay, d2 | | 0.2 | | | 0.3 | 0.1 | 0.1 | 0.1 | | 0.1 | 0.0 | |
| Delay (s) | | 48.5 | | | 48.7 | 48.2 | 0.5 | 0.6 | | 0.1 | 1.0 | |
| Level of Service | | D | | | D | D | A | A | | A | A | |
| Approach Delay (s) | | 48.5 | | | 48.3 | | | 0.6 | | | 1.0 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 1.3 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.43 | A |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 50.2% | 8.6 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Merced Street & Republic Ave

2035 AM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  |  |  |  |  |  |  | |
| Volume (vph) | 32 | 2 | 8 | 38 | 6 | 259 | 9 | 783 | 55 | 490 | 910 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.96 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1707 | | | 1786 | 2787 | 1736 | 3471 | 1583 | 3433 | 3466 | |
| Flt Permitted | | 0.75 | | | 0.79 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1322 | | | 1476 | 2787 | 1736 | 3471 | 1583 | 3433 | 3466 | |
| 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) | 35 | 2 | 9 | 41 | 7 | 282 | 10 | 851 | 60 | 533 | 989 | 8 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 0 | 258 | 0 | 0 | 34 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 38 | 0 | 0 | 48 | 24 | 10 | 851 | 26 | 533 | 997 | 0 |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | |
| Actuated Green, G (s) | | 9.3 | | | 9.3 | 9.3 | 1.5 | 47.1 | 47.1 | 40.1 | 85.7 | |
| Effective Green, g (s) | | 9.3 | | | 9.3 | 9.3 | 1.5 | 47.1 | 47.1 | 40.1 | 85.7 | |
| Actuated g/C Ratio | | 0.08 | | | 0.08 | 0.08 | 0.01 | 0.43 | 0.43 | 0.36 | 0.78 | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 111 | | | 124 | 235 | 23 | 1486 | 677 | 1251 | 2700 | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.25 | | c0.16 | 0.29 | |
| v/s Ratio Perm | | 0.03 | | | c0.03 | 0.01 | | | 0.02 | | | |
| v/c Ratio | | 0.34 | | | 0.39 | 0.10 | 0.43 | 0.57 | 0.04 | 0.43 | 0.37 | |
| Uniform Delay, d1 | | 47.5 | | | 47.7 | 46.5 | 53.8 | 23.8 | 18.3 | 26.3 | 3.8 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.15 | 0.39 | 0.10 | 0.28 | 0.13 | |
| Incremental Delay, d2 | | 1.8 | | | 2.0 | 0.2 | 10.9 | 1.4 | 0.1 | 0.2 | 0.4 | |
| Delay (s) | | 49.3 | | | 49.7 | 46.7 | 72.7 | 10.7 | 1.9 | 7.5 | 0.9 | |
| Level of Service | | D | | | D | D | E | B | A | A | A | |
| Approach Delay (s) | | 49.3 | | | 47.1 | | | 10.8 | | | 3.2 | |
| Approach LOS | | D | | | D | | | B | | | A | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 11.5 | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.49 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | 13.5 | | |
| Intersection Capacity Utilization | | | 55.9% | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 31: Merced St/Merced Street & West Ave 140th

2035 AM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 15 | 4 | 30 | 837 | 659 | 51 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3204 | |
| Flt Permitted | 0.95 | 1.00 | 0.36 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 625 | 3240 | 3204 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 16 | 4 | 33 | 910 | 716 | 55 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 16 | 0 | 33 | 910 | 765 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Effective Green, g (s) | 4.3 | 4.3 | 41.7 | 41.7 | 41.7 | |
| Actuated g/C Ratio | 0.08 | 0.08 | 0.76 | 0.76 | 0.76 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 129 | 103 | 473 | 2456 | 2429 | |
| v/s Ratio Prot | c0.01 | | | c0.28 | 0.24 | |
| v/s Ratio Perm | | 0.00 | 0.05 | | | |
| v/c Ratio | 0.12 | 0.00 | 0.07 | 0.37 | 0.32 | |
| Uniform Delay, d1 | 23.6 | 23.4 | 1.7 | 2.2 | 2.1 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.15 | |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.3 | 0.4 | 0.3 | |
| Delay (s) | 24.0 | 23.4 | 2.0 | 2.7 | 0.6 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 2.6 | 0.6 | |
| Approach LOS | C | | | A | A | |

Intersection Summary
























| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 2.0 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.35 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2035 + Project PM

HCM Signalized Intersection Capacity Analysis
1: Doolittle Dr & Davis St

2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 44 | 95 | 22 | 155 | 77 | 659 | 13 | 463 | 676 | 805 | 784 | 20 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1678 | 3100 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1438 | 3143 | 3225 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1678 | 3100 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1438 | 3143 | 3225 | | |
| 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) | 48 | 103 | 24 | 168 | 84 | 716 | 14 | 503 | 735 | 875 | 852 | 22 | |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 136 | 0 | 0 | 201 | 0 | 1 | 0 | |
| Lane Group Flow (vph) | 48 | 106 | 0 | 168 | 84 | 580 | 14 | 503 | 534 | 875 | 873 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | | |
| Permitted Phases | | | | | | 4 | | | 6 | | | | |
| Actuated Green, G (s) | 4.9 | 13.4 | | 19.9 | 28.4 | 55.4 | 4.9 | 21.2 | 41.1 | 27.0 | 43.3 | | |
| Effective Green, g (s) | 4.9 | 13.4 | | 19.9 | 28.4 | 55.4 | 4.9 | 21.2 | 41.1 | 27.0 | 43.3 | | |
| Actuated g/C Ratio | 0.05 | 0.14 | | 0.21 | 0.29 | 0.57 | 0.05 | 0.22 | 0.42 | 0.28 | 0.45 | | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | | |
| Lane Grp Cap (vph) | 84 | 429 | | 669 | 495 | 853 | 82 | 1019 | 610 | 876 | 1442 | | |
| v/s Ratio Prot | 0.03 | 0.03 | | 0.05 | 0.05 | c0.19 | 0.01 | 0.11 | c0.18 | c0.28 | 0.27 | | |
| v/s Ratio Perm | | | | | | 0.20 | | | 0.19 | | | | |
| v/c Ratio | 0.57 | 0.25 | | 0.25 | 0.17 | 0.68 | 0.17 | 0.49 | 0.87 | 1.00 | 0.61 | | |
| Uniform Delay, d1 | 44.9 | 37.2 | | 32.2 | 25.4 | 14.5 | 44.0 | 33.1 | 25.5 | 34.9 | 20.3 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 5.7 | 0.3 | | 0.1 | 0.2 | 1.8 | 0.4 | 0.5 | 12.9 | 29.9 | 1.0 | | |
| Delay (s) | 50.6 | 37.5 | | 32.3 | 25.6 | 16.3 | 44.4 | 33.6 | 38.3 | 64.7 | 21.2 | | |
| Level of Service | D | D | | C | C | B | D | C | D | E | C | | |
| Approach Delay (s) | | 41.1 | | | 19.9 | | | 36.5 | | | 43.0 | | |
| Approach LOS | | D | | | B | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 35.6 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.90 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 96.8 | | | | | | | | | Sum of lost time (s) | 15.3 |
| Intersection Capacity Utilization | | | 78.4% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

2: Phillips Ln & Davis St

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|-------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↖ | ↖ | ↗ | | ↗ | ↖ | ↖ |
| Volume (vph) | 138 | 1507 | 25 | 23 | 720 | 429 | 54 | 13 | 274 | 455 | 3 | 130 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 14 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 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 | 0.85 | 1.00 | 0.86 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3170 | | 1620 | 3025 | 1328 | 1678 | 1442 | | 3143 | 1415 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.23 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3170 | | 1620 | 3025 | 1328 | 411 | 1442 | | 3143 | 1415 | |
| 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) | 150 | 1638 | 27 | 25 | 783 | 466 | 59 | 14 | 298 | 495 | 3 | 141 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 7 | 162 | 0 | 185 | 0 | 0 | 106 | 0 |
| Lane Group Flow (vph) | 150 | 1664 | 0 | 25 | 865 | 215 | 59 | 127 | 0 | 495 | 38 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | 7 | | 8 | | 7 | | |
| Permitted Phases | | | | | | 6 | 8 | | | | | 7 |
| Actuated Green, G (s) | 14.9 | 44.5 | | 4.5 | 34.1 | 59.9 | 17.2 | 17.2 | | 25.8 | 25.8 | |
| Effective Green, g (s) | 14.9 | 44.5 | | 4.5 | 34.1 | 59.9 | 17.2 | 17.2 | | 25.8 | 25.8 | |
| Actuated g/C Ratio | 0.14 | 0.42 | | 0.04 | 0.32 | 0.57 | 0.16 | 0.16 | | 0.25 | 0.25 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | 3.0 | 2.0 | 2.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 229 | 1343 | | 69 | 982 | 757 | 67 | 236 | | 772 | 347 | |
| v/s Ratio Prot | c0.09 | c0.52 | | 0.02 | 0.29 | 0.07 | | 0.09 | | c0.16 | | |
| v/s Ratio Perm | | | | | | 0.09 | c0.14 | | | | | 0.03 |
| v/c Ratio | 0.66 | 1.24 | | 0.36 | 0.88 | 0.28 | 0.88 | 0.54 | | 0.64 | 0.11 | |
| Uniform Delay, d1 | 42.6 | 30.2 | | 48.9 | 33.5 | 11.6 | 42.9 | 40.3 | | 35.5 | 30.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.48 | 0.71 | 2.58 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.1 | 114.1 | | 1.1 | 10.2 | 0.2 | 68.4 | 1.2 | | 1.8 | 0.1 | |
| Delay (s) | 47.7 | 144.3 | | 73.5 | 34.0 | 30.0 | 111.3 | 41.5 | | 37.3 | 30.8 | |
| Level of Service | D | F | | E | C | C | F | D | | D | C | |
| Approach Delay (s) | | 136.3 | | | 33.6 | | | 52.6 | | | 35.8 | |
| Approach LOS | | F | | | C | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 81.1 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 0.98 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 98.1% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 3: Westgate Pkwy/Warden Ave & Davis St

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | ↘ | ↑↑↑ | | ↘↘ | ↑↑↑ | | | ↑ | ↘↘ | ↘ | ↑ | |
| Volume (vph) | 25 | 1948 | 229 | 345 | 1016 | 97 | 152 | 23 | 490 | 65 | 22 | 26 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 11 | 11 | 13 | 13 | 13 | 9 | 9 | 9 |
| Total Lost time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.91 | | | 1.00 | 0.88 | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.99 | 1.00 | 0.97 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.99 | | | 1.00 | 0.85 | 1.00 | 0.92 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 4497 | | 3143 | 4706 | | | 1809 | 2805 | 1562 | 1468 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.72 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 4497 | | 3143 | 4706 | | | 1354 | 2805 | 1562 | 1468 | |
| 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) | 27 | 2117 | 249 | 375 | 1104 | 105 | 165 | 25 | 533 | 71 | 24 | 28 |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 8 | 0 | 0 | 0 | 145 | 0 | 25 | 0 |
| Lane Group Flow (vph) | 27 | 2354 | 0 | 375 | 1201 | 0 | 0 | 190 | 388 | 71 | 27 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 3 | | | | | | 13 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | pm+ov | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | 1 | 7 | 7 | |
| Permitted Phases | | | | | | | 8 | | 8 | | | |
| Actuated Green, G (s) | 5.5 | 47.6 | | 15.9 | 58.5 | | | 18.4 | 34.3 | 9.6 | 9.6 | |
| Effective Green, g (s) | 5.5 | 47.6 | | 15.9 | 58.5 | | | 18.4 | 34.3 | 9.6 | 9.6 | |
| Actuated g/C Ratio | 0.05 | 0.45 | | 0.15 | 0.56 | | | 0.18 | 0.33 | 0.09 | 0.09 | |
| Clearance Time (s) | 3.0 | 4.0 | | 3.5 | 4.0 | | | 3.0 | 3.5 | 3.0 | 3.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | | 2.0 | 2.0 | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 84 | 2038 | | 475 | 2621 | | | 237 | 916 | 142 | 134 | |
| v/s Ratio Prot | 0.02 | c0.52 | | c0.12 | 0.26 | | | | 0.06 | c0.05 | 0.02 | |
| v/s Ratio Perm | | | | | | | | c0.14 | 0.07 | | | |
| v/c Ratio | 0.32 | 1.16 | | 0.79 | 0.46 | | | 0.80 | 0.42 | 0.50 | 0.20 | |
| Uniform Delay, d1 | 48.0 | 28.7 | | 42.9 | 13.8 | | | 41.5 | 27.6 | 45.4 | 44.1 | |
| Progression Factor | 0.85 | 1.00 | | 1.23 | 1.08 | | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.1 | 70.4 | | 4.9 | 0.4 | | | 16.6 | 0.1 | 1.0 | 0.3 | |
| Delay (s) | 41.0 | 98.9 | | 57.9 | 15.2 | | | 58.1 | 27.7 | 46.4 | 44.4 | |
| Level of Service | D | F | | E | B | | | E | C | D | D | |
| Approach Delay (s) | | 98.3 | | | 25.3 | | | 35.7 | | | 45.6 | |
| Approach LOS | | F | | | C | | | D | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 63.6 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.95 | E |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 80.8% | 13.5 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | D |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: I-880 SB ramps & Davis St/Davis Street

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|--------|------|------|------|------|------|------|-------|------|------|
| Lane Configurations | | ↑↑ | ↗ | | ↑↑ | | | | | ↘ | ↕ | ↗ |
| Volume (vph) | 0 | 1607 | 825 | 0 | 1092 | 446 | 0 | 0 | 0 | 349 | 0 | 431 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 10 | 10 | 10 | 11 | 16 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 1.00 | | 0.95 | | | | | 0.95 | 0.91 | 0.95 |
| Frbp, ped/bikes | | 1.00 | 0.98 | | 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 | 0.85 | | 0.96 | | | | | 1.00 | 0.89 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.99 | 1.00 |
| Satd. Flow (prot) | | 3292 | 1439 | | 3095 | | | | | 1681 | 1464 | 1461 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | | | | 0.95 | 0.99 | 1.00 |
| Satd. Flow (perm) | | 3292 | 1439 | | 3095 | | | | | 1681 | 1464 | 1461 |
| 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 | 1747 | 897 | 0 | 1187 | 485 | 0 | 0 | 0 | 379 | 0 | 468 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 27 | 27 |
| Lane Group Flow (vph) | 0 | 1747 | 897 | 0 | 1637 | 0 | 0 | 0 | 0 | 296 | 253 | 244 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | 2 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 6% | 6% | 2% | 5% | 2% | 2% | 2% | 2% | 2% | 2% | 5% |
| Turn Type | | NA | custom | | NA | | | | | Split | NA | Prot |
| Protected Phases | | 2 | | | 6 | | | | | 4 | 4 | 4 |
| Permitted Phases | | 2 | 2 4 | | | | | | | | | |
| Actuated Green, G (s) | | 60.4 | 105.0 | | 60.4 | | | | | 36.6 | 36.6 | 36.6 |
| Effective Green, g (s) | | 60.4 | 105.0 | | 60.4 | | | | | 36.6 | 36.6 | 36.6 |
| Actuated g/C Ratio | | 0.58 | 1.00 | | 0.58 | | | | | 0.35 | 0.35 | 0.35 |
| Clearance Time (s) | | 4.0 | | | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 2.0 | | | 3.5 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1893 | 1439 | | 1780 | | | | | 585 | 510 | 509 |
| v/s Ratio Prot | | c0.53 | | | 0.53 | | | | | 0.18 | 0.17 | 0.17 |
| v/s Ratio Perm | | | c0.62 | | | | | | | | | |
| v/c Ratio | | 0.92 | 0.62 | | 0.92 | | | | | 0.51 | 0.50 | 0.48 |
| Uniform Delay, d1 | | 20.2 | 0.0 | | 20.1 | | | | | 27.0 | 26.9 | 26.8 |
| Progression Factor | | 0.60 | 1.00 | | 0.72 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 2.5 | 0.2 | | 8.3 | | | | | 0.7 | 0.8 | 0.7 |
| Delay (s) | | 14.7 | 0.2 | | 22.8 | | | | | 27.7 | 27.7 | 27.5 |
| Level of Service | | B | A | | C | | | | | C | C | C |
| Approach Delay (s) | | 9.8 | | | 22.8 | | | 0.0 | | | 27.6 | |
| Approach LOS | | A | | | C | | | A | | | C | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 16.9 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.84 | B |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 72.2% | 8.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| c Critical Lane Group | | C |

HCM Signalized Intersection Capacity Analysis

5: I-880 NB Ramps & Davis Street

2035 PM + Project



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑ | | | ↑↑ | ↘↘ | ↗ |
| Volume (vph) | 1126 | 745 | 0 | 1076 | 420 | 539 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Lane Util. Factor | 0.95 | | | 0.95 | 0.97 | 0.91 |
| Fr _t | 0.94 | | | 1.00 | 0.95 | 0.85 |
| Fl _t Protected | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3328 | | | 3539 | 3314 | 1441 |
| Fl _t Permitted | 1.00 | | | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3328 | | | 3539 | 3314 | 1441 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1224 | 810 | 0 | 1170 | 457 | 586 |
| RTOR Reduction (vph) | 76 | 0 | 0 | 0 | 37 | 37 |
| Lane Group Flow (vph) | 1958 | 0 | 0 | 1170 | 672 | 297 |
| Turn Type | NA | | | NA | Prot | Prot |
| Protected Phases | 2 | | | 2 | 4 | 4 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 70.1 | | | 70.1 | 27.9 | 27.9 |
| Effective Green, g (s) | 70.1 | | | 70.1 | 27.9 | 27.9 |
| Actuated g/C Ratio | 0.67 | | | 0.67 | 0.27 | 0.27 |
| Clearance Time (s) | 4.0 | | | 4.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 4.0 | | | 4.0 | 2.0 | 2.0 |
| Lane Grp Cap (vph) | 2221 | | | 2362 | 880 | 382 |
| v/s Ratio Prot | c0.59 | | | 0.33 | 0.20 | c0.21 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.88 | | | 0.50 | 0.76 | 0.78 |
| Uniform Delay, d ₁ | 14.1 | | | 8.7 | 35.5 | 35.7 |
| Progression Factor | 0.42 | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d ₂ | 3.0 | | | 0.7 | 3.6 | 8.8 |
| Delay (s) | 8.9 | | | 9.4 | 39.1 | 44.5 |
| Level of Service | A | | | A | D | D |
| Approach Delay (s) | 8.9 | | | 9.4 | 40.8 | |
| Approach LOS | A | | | A | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 16.9 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.85 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 7.0 |
| Intersection Capacity Utilization | 83.9% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis

6: Doolittle Dr & Williams St

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|---------------------------|------|------|-------|------|-------|------|------|--|
| Lane Configurations | | ↕ | | | ↕ | ↕ | ↕ | ↕↔ | | ↕ | ↕↔ | | |
| Volume (vph) | 53 | 82 | 22 | 99 | 72 | 83 | 16 | 905 | 73 | 166 | 878 | 52 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 11 | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 9 | 10 | 15 | |
| Total Lost time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | | 0.98 | | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 0.99 | | |
| Flt Protected | | 0.98 | | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | | 1524 | | | 1682 | 1300 | 1620 | 3038 | | 1562 | 3046 | | |
| Flt Permitted | | 0.80 | | | 0.69 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | | 1239 | | | 1199 | 1300 | 1620 | 3038 | | 1562 | 3046 | | |
| 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) | 58 | 89 | 24 | 108 | 78 | 90 | 17 | 984 | 79 | 180 | 954 | 57 | |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 0 | 70 | 0 | 7 | 0 | 0 | 3 | 0 | |
| Lane Group Flow (vph) | 0 | 164 | 0 | 0 | 186 | 20 | 17 | 1056 | 0 | 180 | 1008 | 0 | |
| Confl. Peds. (#/hr) | 14 | | | | | | 14 | 5 | | 2 | 2 | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | |
| Parking (#/hr) | 0 | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | | |
| Actuated Green, G (s) | | 16.8 | | | 16.8 | 16.8 | 1.5 | 32.7 | | 14.4 | 45.1 | | |
| Effective Green, g (s) | | 16.8 | | | 16.8 | 16.8 | 1.5 | 32.7 | | 14.4 | 45.1 | | |
| Actuated g/C Ratio | | 0.22 | | | 0.22 | 0.22 | 0.02 | 0.42 | | 0.19 | 0.58 | | |
| Clearance Time (s) | | 4.6 | | | 4.6 | 4.6 | 4.5 | 4.6 | | 4.0 | 4.6 | | |
| Vehicle Extension (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | | 269 | | | 261 | 283 | 31 | 1288 | | 291 | 1781 | | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.35 | | c0.12 | 0.33 | | |
| v/s Ratio Perm | | 0.13 | | | c0.16 | 0.02 | | | | | | | |
| v/c Ratio | | 0.61 | | | 0.71 | 0.07 | 0.55 | 0.82 | | 0.62 | 0.57 | | |
| Uniform Delay, d1 | | 27.2 | | | 27.9 | 23.9 | 37.5 | 19.6 | | 28.8 | 9.9 | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | | 4.5 | | | 9.5 | 0.1 | 22.6 | 4.4 | | 4.4 | 0.5 | | |
| Delay (s) | | 31.7 | | | 37.4 | 24.1 | 60.1 | 24.0 | | 33.3 | 10.4 | | |
| Level of Service | | C | | | D | C | E | C | | C | B | | |
| Approach Delay (s) | | 31.7 | | | 33.0 | | | 24.6 | | | 13.9 | | |
| Approach LOS | | C | | | C | | | C | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.2 | | HCM 2000 Level of Service | | | | | | C | | |
| HCM 2000 Volume to Capacity ratio | | | 0.75 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 77.1 | | Sum of lost time (s) | | | | | 13.7 | | | |
| Intersection Capacity Utilization | | | 64.9% | | ICU Level of Service | | | | | | C | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

7: Williams St & Westgate Pkwy

2035 PM + Project

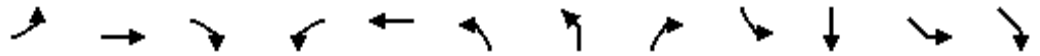


| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|-------|------|------|-------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 53 | 433 | 226 | 323 | 265 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 12 | 10 | 14 | 9 | 9 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1620 | 1827 | 1705 | 1556 | 1562 | 1349 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1620 | 1827 | 1705 | 1556 | 1562 | 1349 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 58 | 471 | 246 | 351 | 288 | 58 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 146 | 0 | 33 |
| Lane Group Flow (vph) | 58 | 471 | 246 | 205 | 288 | 25 |
| Confl. Peds. (#/hr) | | | | 14 | | 5 |
| Confl. Bikes (#/hr) | | | | 5 | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | NA | Perm | Prot | Perm |
| Protected Phases | 5 | 2 | 6 | | 4 | |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 7.4 | 75.8 | 64.4 | 64.4 | 25.6 | 25.6 |
| Effective Green, g (s) | 7.4 | 75.8 | 64.4 | 64.4 | 25.6 | 25.6 |
| Actuated g/C Ratio | 0.07 | 0.69 | 0.59 | 0.59 | 0.23 | 0.23 |
| Clearance Time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 |
| Vehicle Extension (s) | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 108 | 1258 | 998 | 910 | 363 | 313 |
| v/s Ratio Prot | c0.04 | c0.26 | 0.14 | | c0.18 | |
| v/s Ratio Perm | | | | 0.13 | | 0.02 |
| v/c Ratio | 0.54 | 0.37 | 0.25 | 0.23 | 0.79 | 0.08 |
| Uniform Delay, d1 | 49.6 | 7.2 | 11.0 | 10.9 | 39.7 | 33.0 |
| Progression Factor | 1.00 | 1.00 | 1.58 | 4.73 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.6 | 0.9 | 0.5 | 0.5 | 11.3 | 0.1 |
| Delay (s) | 52.2 | 8.0 | 18.0 | 52.0 | 51.0 | 33.1 |
| Level of Service | D | A | B | D | D | C |
| Approach Delay (s) | | 12.9 | 38.0 | | 48.0 | |
| Approach LOS | | B | D | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 31.3 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.51 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.6 |
| Intersection Capacity Utilization | 46.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis 2035 PM + Project
8: Merced Street/Bulling Metal Works Driveway & Williams St & ACE Truck Repair Driveway



| Movement | EBL | EBT | EBR | WBL | WBT | NBL2 | NBL | NBR | SBL | SBT | SEL | SER |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|
| Lane Configurations | | ↑ | ↗ | ↖ | ↗ | | ↖ | ↗ | | ↕ | ↘ | ↙ |
| Volume (vph) | 2 | 294 | 400 | 130 | 212 | 274 | 8 | 184 | 1 | 8 | 1 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 11 | 11 | 9 | 10 | 11 | 11 | 16 | 12 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.97 | | 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 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.85 | | 1.00 | 0.88 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | 1759 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | 1757 | 1442 | 1562 | 1705 | | 1678 | 1709 | | 1853 | 1597 | |
| 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) | 2 | 320 | 435 | 141 | 230 | 298 | 9 | 200 | 1 | 9 | 1 | 9 |
| RTOR Reduction (vph) | 0 | 0 | 252 | 0 | 0 | 0 | 0 | 105 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 322 | 183 | 141 | 230 | 0 | 307 | 95 | 0 | 10 | 10 | 0 |
| Confl. Peds. (#/hr) | | | 14 | | | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | 7 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Turn Type | Perm | NA | Perm | Prot | NA | Prot | Prot | Perm | Split | NA | Prot | |
| Protected Phases | | 2 | | 1 | 6 | 4 | 4 | | 8 | 8 | 7 | |
| Permitted Phases | 2 | | 2 | | | | | 4 | | | | |
| Actuated Green, G (s) | | 46.2 | 46.2 | 14.9 | 65.1 | | 24.5 | 24.5 | | 1.4 | 2.4 | |
| Effective Green, g (s) | | 46.2 | 46.2 | 14.9 | 65.1 | | 24.5 | 24.5 | | 1.4 | 2.4 | |
| Actuated g/C Ratio | | 0.42 | 0.42 | 0.14 | 0.59 | | 0.22 | 0.22 | | 0.01 | 0.02 | |
| Clearance Time (s) | | 4.6 | 4.6 | 4.0 | 4.6 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 737 | 605 | 211 | 1009 | | 373 | 380 | | 23 | 34 | |
| v/s Ratio Prot | | | | c0.09 | 0.13 | | c0.18 | | | c0.01 | c0.01 | |
| v/s Ratio Perm | | c0.18 | 0.13 | | | | | 0.06 | | | | |
| v/c Ratio | | 0.44 | 0.30 | 0.67 | 0.23 | | 0.82 | 0.25 | | 0.43 | 0.29 | |
| Uniform Delay, d1 | | 22.7 | 21.2 | 45.2 | 10.6 | | 40.7 | 35.2 | | 53.9 | 53.0 | |
| Progression Factor | | 0.83 | 1.31 | 1.00 | 1.00 | | 0.66 | 0.29 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.7 | 1.1 | 7.8 | 0.5 | | 13.0 | 0.3 | | 12.6 | 4.8 | |
| Delay (s) | | 20.5 | 28.8 | 53.0 | 11.1 | | 40.0 | 10.5 | | 66.5 | 57.7 | |
| Level of Service | | C | C | D | B | | D | B | | E | E | |
| Approach Delay (s) | | 25.3 | | | 27.0 | | | | | 66.5 | 57.7 | |
| Approach LOS | | C | | | C | | | | | E | E | |













| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 27.1 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.58 | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) 20.6 |
| Intersection Capacity Utilization | 81.1% | ICU Level of Service D |
| Analysis Period (min) | 15 | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

















9: Monarch Bay Drive/Marina Boulevard & Neptune Drive

2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | ↑ | | | ↑ | ↗ | | | ↗ | ↗ | | |
| Volume (veh/h) | 0 | 635 | 5 | 0 | 490 | 13 | 0 | 0 | 15 | 21 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 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 |
| Hourly flow rate (vph) | 0 | 690 | 5 | 0 | 533 | 14 | 0 | 0 | 16 | 23 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 547 | | | 696 | | | 1226 | 1240 | 693 | 1242 | 1228 | 533 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 547 | | | 696 | | | 1226 | 1240 | 693 | 1242 | 1228 | 533 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 96 | 84 | 100 | 100 |
| cM capacity (veh/h) | 1023 | | | 900 | | | 156 | 175 | 443 | 146 | 178 | 547 |
| Direction, Lane # | EB 1 | WB 1 | WB 2 | NB 1 | SB 1 | | | | | | | |
| Volume Total | 696 | 533 | 14 | 16 | 23 | | | | | | | |
| Volume Left | 0 | 0 | 0 | 0 | 23 | | | | | | | |
| Volume Right | 5 | 0 | 14 | 16 | 0 | | | | | | | |
| cSH | 1700 | 1700 | 1700 | 443 | 146 | | | | | | | |
| Volume to Capacity | 0.41 | 0.31 | 0.01 | 0.04 | 0.16 | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | 3 | 13 | | | | | | | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 13.4 | 34.2 | | | | | | | |
| Lane LOS | | | | B | D | | | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 13.4 | 34.2 | | | | | | | |
| Approach LOS | | | | B | D | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | 0.8 | | | | | | | | |
| Intersection Capacity Utilization | | | 50.4% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 43 | 612 | 16 | 44 | 434 | 51 | 16 | 43 | 33 | 26 | 39 | 33 |
| 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 |
| Hourly flow rate (vph) | 47 | 665 | 17 | 48 | 472 | 55 | 17 | 47 | 36 | 28 | 42 | 36 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 729 | 575 | 100 | 107 | | | | | | | | |
| Volume Left (vph) | 47 | 48 | 17 | 28 | | | | | | | | |
| Volume Right (vph) | 17 | 55 | 36 | 36 | | | | | | | | |
| Hadj (s) | 0.03 | -0.01 | -0.15 | -0.11 | | | | | | | | |
| Departure Headway (s) | 5.7 | 5.6 | 7.2 | 7.2 | | | | | | | | |
| Degree Utilization, x | 1.0 | 0.90 | 0.20 | 0.21 | | | | | | | | |
| Capacity (veh/h) | 630 | 631 | 472 | 468 | | | | | | | | |
| Control Delay (s) | 104.3 | 39.3 | 12.0 | 12.2 | | | | | | | | |
| Approach Delay (s) | 104.3 | 39.3 | 12.0 | 12.2 | | | | | | | | |
| Approach LOS | F | E | B | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 67.0 | | | | | | | | | |
| Level of Service | | | F | | | | | | | | | |
| Intersection Capacity Utilization | | | 59.2% | ICU Level of Service | B | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd























2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 187 | 477 | 36 | 229 | 404 | 264 | 31 | 563 | 217 | 262 | 692 | 145 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1448 | 1620 | 1739 | 1390 | 1652 | 3240 | 1331 | 1620 | 2992 | 2992 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1448 | 1620 | 1739 | 1390 | 1652 | 3240 | 1331 | 1620 | 2992 | 2992 | |
| 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) | 203 | 518 | 39 | 249 | 439 | 287 | 34 | 612 | 236 | 285 | 752 | 158 | |
| RTOR Reduction (vph) | 0 | 0 | 31 | 0 | 0 | 181 | 0 | 0 | 100 | 0 | 11 | 0 | |
| Lane Group Flow (vph) | 203 | 518 | 8 | 249 | 439 | 106 | 34 | 612 | 136 | 285 | 899 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 20.0 | 23.5 | 23.5 | 22.6 | 26.1 | 26.1 | 5.7 | 30.1 | 30.1 | 26.7 | 51.1 | | |
| Effective Green, g (s) | 20.0 | 23.5 | 23.5 | 22.6 | 26.1 | 26.1 | 5.7 | 30.1 | 30.1 | 26.7 | 51.1 | | |
| Actuated g/C Ratio | 0.17 | 0.19 | 0.19 | 0.19 | 0.22 | 0.22 | 0.05 | 0.25 | 0.25 | 0.22 | 0.42 | | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 273 | 338 | 281 | 302 | 375 | 300 | 77 | 806 | 331 | 357 | 1264 | | |
| v/s Ratio Prot | 0.12 | c0.30 | | c0.15 | c0.25 | | 0.02 | 0.19 | | c0.18 | c0.30 | | |
| v/s Ratio Perm | | | 0.01 | | | 0.08 | | | 0.10 | | | | |
| v/c Ratio | 0.74 | 1.53 | 0.03 | 0.82 | 1.17 | 0.35 | 0.44 | 0.76 | 0.41 | 0.80 | 0.71 | | |
| Uniform Delay, d1 | 48.0 | 48.7 | 39.4 | 47.2 | 47.4 | 40.2 | 56.1 | 42.0 | 38.0 | 44.6 | 28.8 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 11.1 | 254.1 | 0.1 | 17.2 | 101.7 | 1.0 | 5.4 | 4.4 | 1.1 | 12.4 | 2.1 | | |
| Delay (s) | 59.1 | 302.8 | 39.5 | 64.4 | 149.1 | 41.2 | 61.5 | 46.4 | 39.1 | 57.0 | 30.9 | | |
| Level of Service | E | F | D | E | F | D | E | D | D | E | C | | |
| Approach Delay (s) | | 224.2 | | | 95.7 | | | 45.1 | | | 37.1 | | |
| Approach LOS | | F | | | F | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 91.2 | | | | | | | | | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | | | 0.96 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.9 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 83.4% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: Merced St & Marina Blvd

2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  | |  |  |  |  |  |  | |
| Volume (vph) | 59 | 987 | 95 | 906 | 720 | 134 | 221 | 294 | 1199 | 323 | 222 | 41 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4594 | | 3255 | 3155 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4594 | | 3255 | 3155 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1473 | |
| 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) | 64 | 1073 | 103 | 985 | 783 | 146 | 240 | 320 | 1303 | 351 | 241 | 45 | |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | |
| Lane Group Flow (vph) | 64 | 1166 | 0 | 985 | 915 | 0 | 240 | 320 | 1303 | 351 | 241 | 10 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 8.0 | 27.0 | | 28.0 | 47.0 | | 13.0 | 25.0 | 57.0 | 11.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 8.0 | 28.5 | | 28.0 | 48.5 | | 13.0 | 26.5 | 57.0 | 11.0 | 24.5 | 24.5 | |
| Actuated g/C Ratio | 0.07 | 0.26 | | 0.25 | 0.44 | | 0.12 | 0.24 | 0.52 | 0.10 | 0.22 | 0.22 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 113 | 1190 | | 828 | 1391 | | 198 | 808 | 1402 | 325 | 721 | 328 | |
| v/s Ratio Prot | 0.04 | c0.25 | | c0.30 | 0.29 | | c0.14 | 0.10 | c0.48 | 0.11 | 0.07 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 | |
| v/c Ratio | 0.57 | 0.98 | | 1.19 | 0.66 | | 1.21 | 0.40 | 0.93 | 1.08 | 0.33 | 0.03 | |
| Uniform Delay, d1 | 49.3 | 40.5 | | 41.0 | 24.2 | | 48.5 | 35.0 | 24.6 | 49.5 | 35.9 | 33.5 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.86 | 0.54 | 0.31 | 1.00 | 0.92 | 1.00 | |
| Incremental Delay, d2 | 7.7 | 21.6 | | 97.3 | 2.4 | | 130.3 | 0.4 | 10.4 | 72.4 | 0.4 | 0.1 | |
| Delay (s) | 57.0 | 62.1 | | 138.3 | 26.7 | | 171.8 | 19.4 | 18.0 | 121.8 | 33.5 | 33.5 | |
| Level of Service | E | E | | F | C | | F | B | B | F | C | C | |
| Approach Delay (s) | | 61.8 | | | 84.1 | | | 38.1 | | | 82.2 | | |
| Approach LOS | | E | | | F | | | D | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 63.8 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 1.11 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | | | 91.8% | | | | | | | | | ICU Level of Service | F |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2035 PM + Project



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | ↑↑↑↑ | | ↵ | ↑↑ | | ↵ |
| Volume (vph) | 2594 | 74 | 279 | 0 | 0 | 523 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 1.00 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6381 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6381 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 2820 | 80 | 303 | 0 | 0 | 568 |
| RTOR Reduction (vph) | 5 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 2895 | 0 | 303 | 0 | 0 | 568 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 33.5 | | 26.0 | | | 26.0 |
| Effective Green, g (s) | 33.5 | | 26.0 | | | 26.0 |
| Actuated g/C Ratio | 0.49 | | 0.38 | | | 0.38 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 3098 | | 666 | | | 607 |
| v/s Ratio Prot | c0.45 | | 0.17 | | | c0.35 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.93 | | 0.45 | | | 0.94 |
| Uniform Delay, d1 | 16.7 | | 16.2 | | | 20.7 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 6.1 | | 0.5 | | | 21.8 |
| Delay (s) | 22.8 | | 16.7 | | | 42.5 |
| Level of Service | C | | B | | | D |
| Approach Delay (s) | 22.8 | | | 16.7 | 42.5 | |
| Approach LOS | C | | | B | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 25.3 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.93 | | |
| Actuated Cycle Length (s) | 69.0 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 79.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|---------------------|-------|-------|-------|-------|---------------------------|------|------|------|------|-------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1898 | 1059 | 408 | 961 | 0 | 0 | 0 | 592 | 0 | 0 | 1096 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 2063 | 1151 | 443 | 1045 | 0 | 0 | 0 | 643 | 0 | 0 | 1191 |
| RTOR Reduction (vph) | 0 | 0 | 280 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 200 |
| Lane Group Flow (vph) | 0 | 2063 | 871 | 443 | 1045 | 0 | 0 | 0 | 643 | 0 | 0 | 991 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 79.5 | 79.5 | 18.5 | 105.0 | | | | 38.5 | | | 38.5 |
| Effective Green, g (s) | | 79.5 | 79.5 | 18.5 | 105.0 | | | | 38.5 | | | 38.5 |
| Actuated g/C Ratio | | 0.53 | 0.53 | 0.12 | 0.70 | | | | 0.26 | | | 0.26 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1778 | 1400 | 387 | 2348 | | | | 748 | | | 715 |
| v/s Ratio Prot | | c0.61 | | c0.14 | 0.31 | | | | 0.22 | | | c0.36 |
| v/s Ratio Perm | | | 0.33 | | | | | | | | | |
| v/c Ratio | | 1.16 | 0.62 | 1.14 | 0.45 | | | | 0.86 | | | 1.39 |
| Uniform Delay, d1 | | 35.2 | 24.7 | 65.8 | 9.8 | | | | 53.2 | | | 55.8 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 78.8 | 0.9 | 91.3 | 0.1 | | | | 9.7 | | | 182.3 |
| Delay (s) | | 114.1 | 25.6 | 157.1 | 9.9 | | | | 62.9 | | | 238.1 |
| Level of Service | | F | C | F | A | | | | E | | | F |
| Approach Delay (s) | | 82.4 | | | 53.8 | | | 62.9 | | | 238.1 | |
| Approach LOS | | F | | | D | | | E | | | F | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 102.3 | | | HCM 2000 Level of Service | | | F | | | |
| HCM 2000 Volume to Capacity ratio | | | 1.22 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 150.0 | | | Sum of lost time (s) | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 80.7% | | | ICU Level of Service | | | D | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

2035 PM + Project



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↙ | ↑↑↑ | ↑↑ | ↘ | | |
| Volume (vph) | 804 | 0 | 845 | 502 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 874 | 0 | 918 | 546 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 66 | 0 | 0 |
| Lane Group Flow (vph) | 874 | 0 | 918 | 480 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 34.6 | | 24.8 | 24.8 | | |
| Effective Green, g (s) | 34.6 | | 24.8 | 24.8 | | |
| Actuated g/C Ratio | 0.51 | | 0.36 | 0.36 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 819 | | 1216 | 555 | | |
| v/s Ratio Prot | c0.54 | | 0.27 | | | |
| v/s Ratio Perm | | | | c0.31 | | |
| v/c Ratio | 1.07 | | 0.75 | 0.86 | | |
| Uniform Delay, d1 | 16.9 | | 19.1 | 20.2 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 50.9 | | 2.7 | 13.2 | | |
| Delay (s) | 67.8 | | 21.8 | 33.4 | | |
| Level of Service | E | | C | C | | |
| Approach Delay (s) | | 67.8 | 26.2 | | 0.0 | |
| Approach LOS | | E | C | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 41.7 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.98 | | |
| Actuated Cycle Length (s) | 68.4 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 83.1% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 16: Teagarden St/Wayne Ave & Marina Blvd
























2035 PM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|-------|------|----------------------|---------------------------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 337 | 1807 | 322 | 180 | 725 | 30 | 365 | 25 | 115 | 20 | 49 | 59 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 12 | 11 | 10 | 10 | 10 | 10 | 12 | 10 | 11 | 11 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | 1.00 | | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (prot) | 1620 | 4655 | 1530 | 1678 | 4622 | | 1539 | 1552 | 1513 | | 1740 | 1489 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.96 | 1.00 | | 0.99 | 1.00 |
| Satd. Flow (perm) | 1620 | 4655 | 1530 | 1678 | 4622 | | 1539 | 1552 | 1513 | | 1740 | 1489 |
| 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) | 366 | 1964 | 350 | 196 | 788 | 33 | 397 | 27 | 125 | 22 | 53 | 64 |
| RTOR Reduction (vph) | 0 | 0 | 140 | 0 | 3 | 0 | 0 | 0 | 101 | 0 | 0 | 61 |
| Lane Group Flow (vph) | 366 | 1964 | 210 | 196 | 818 | 0 | 210 | 214 | 24 | 0 | 75 | 3 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 2 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Split | NA | Perm | Split | NA | Prot |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 7 | 7 | 7 |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 31.6 | 59.0 | 59.0 | 13.0 | 40.4 | | 23.0 | 23.0 | 23.0 | | 5.8 | 5.8 |
| Effective Green, g (s) | 31.6 | 59.0 | 59.0 | 13.0 | 40.4 | | 23.0 | 23.0 | 23.0 | | 5.8 | 5.8 |
| Actuated g/C Ratio | 0.26 | 0.49 | 0.49 | 0.11 | 0.34 | | 0.19 | 0.19 | 0.19 | | 0.05 | 0.05 |
| Clearance Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 4.6 | 4.6 | 4.6 | | 4.6 | 4.6 |
| Vehicle Extension (s) | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 426 | 2288 | 752 | 181 | 1556 | | 294 | 297 | 289 | | 84 | 71 |
| v/s Ratio Prot | 0.23 | c0.42 | | c0.12 | 0.18 | | 0.14 | c0.14 | | | c0.04 | 0.00 |
| v/s Ratio Perm | | | 0.14 | | | | | | 0.02 | | | |
| v/c Ratio | 0.86 | 0.86 | 0.28 | 1.08 | 0.53 | | 0.71 | 0.72 | 0.08 | | 0.89 | 0.04 |
| Uniform Delay, d1 | 42.1 | 26.8 | 18.0 | 53.5 | 32.1 | | 45.4 | 45.5 | 39.8 | | 56.8 | 54.5 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 16.2 | 4.5 | 0.9 | 90.7 | 1.3 | | 8.5 | 8.9 | 0.2 | | 64.6 | 0.3 |
| Delay (s) | 58.3 | 31.3 | 18.9 | 144.2 | 33.3 | | 53.9 | 54.4 | 40.0 | | 121.4 | 54.8 |
| Level of Service | E | C | B | F | C | | D | D | D | | F | D |
| Approach Delay (s) | | 33.4 | | | 54.7 | | | 50.9 | | | 90.7 | |
| Approach LOS | | C | | | D | | | D | | | F | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 42.3 | | | | HCM 2000 Level of Service | | D | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.86 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | Sum of lost time (s) | | 19.2 | | | | |
| Intersection Capacity Utilization | | | 75.1% | | | ICU Level of Service | | D | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Alvarado St & Marina Blvd

2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  | |  |  |  |  |  |  |
| Volume (vph) | 99 | 1537 | 190 | 297 | 606 | 46 | 214 | 355 | 714 | 31 | 117 | 74 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 11 | 10 | 10 | 13 | 10 | 10 | 14 | 10 | 10 | 10 |
| Total Lost time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1620 | 3303 | 1501 | 1652 | 3249 | | 3143 | 3240 | 1660 | 3204 | 3025 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1620 | 3303 | 1501 | 1652 | 3249 | | 3143 | 3240 | 1660 | 3204 | 3025 | |
| 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) | 108 | 1671 | 207 | 323 | 659 | 50 | 233 | 386 | 776 | 34 | 127 | 80 |
| RTOR Reduction (vph) | 0 | 0 | 88 | 0 | 5 | 0 | 0 | 0 | 191 | 0 | 71 | 0 |
| Lane Group Flow (vph) | 108 | 1671 | 119 | 323 | 704 | 0 | 233 | 386 | 585 | 34 | 136 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 2 | | | | | | 8 | | | |
| Actuated Green, G (s) | 11.1 | 43.4 | 43.4 | 15.0 | 47.3 | | 21.7 | 31.2 | 31.2 | 2.4 | 12.3 | |
| Effective Green, g (s) | 11.1 | 43.4 | 43.4 | 15.0 | 47.3 | | 21.7 | 31.2 | 31.2 | 2.4 | 12.3 | |
| Actuated g/C Ratio | 0.10 | 0.39 | 0.39 | 0.14 | 0.43 | | 0.20 | 0.28 | 0.28 | 0.02 | 0.11 | |
| Clearance Time (s) | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | | 4.0 | 5.0 | 5.0 | 4.0 | 4.6 | |
| Vehicle Extension (s) | 2.0 | 6.0 | 6.0 | 4.0 | 6.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 163 | 1303 | 592 | 225 | 1397 | | 620 | 918 | 470 | 69 | 338 | |
| v/s Ratio Prot | 0.07 | c0.51 | | c0.20 | c0.22 | | 0.07 | 0.12 | | 0.01 | c0.04 | |
| v/s Ratio Perm | | | 0.08 | | | | | | c0.35 | | | |
| v/c Ratio | 0.66 | 1.28 | 0.20 | 1.44 | 0.50 | | 0.38 | 0.42 | 1.25 | 0.49 | 0.40 | |
| Uniform Delay, d1 | 47.6 | 33.3 | 21.9 | 47.5 | 22.8 | | 38.3 | 32.0 | 39.4 | 53.2 | 45.4 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.6 | 133.1 | 0.8 | 219.5 | 1.3 | | 0.5 | 0.4 | 127.4 | 7.4 | 1.1 | |
| Delay (s) | 55.2 | 166.4 | 22.7 | 267.0 | 24.1 | | 38.8 | 32.5 | 166.8 | 60.6 | 46.5 | |
| Level of Service | E | F | C | F | C | | D | C | F | E | D | |
| Approach Delay (s) | | 145.4 | | | 100.1 | | | 108.2 | | | 48.5 | |
| Approach LOS | | F | | | F | | | F | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 119.2 | | | HCM 2000 Level of Service | | F | | | | |
| HCM 2000 Volume to Capacity ratio | | | 1.25 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | Sum of lost time (s) | | 18.0 | | | | |
| Intersection Capacity Utilization | | | 101.9% | | | ICU Level of Service | | G | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2035 PM + Project

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|-------|--------|------|------|------|-------|-------|------|------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 1073 | 719 | 490 | 4 | 300 | 48 | 241 | 951 | 14 | 87 | 977 | 440 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 | |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.95 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1738 | 1478 | 1652 | 3530 | | 1652 | 3131 | | |
| Flt Permitted | 0.17 | 1.00 | 1.00 | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 302 | 1739 | 1770 | | 1688 | 1478 | 1652 | 3530 | | 1652 | 3131 | | |
| 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) | 1166 | 782 | 533 | 4 | 326 | 52 | 262 | 1034 | 15 | 95 | 1062 | 478 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1 | 0 | 0 | 51 | 0 | |
| Lane Group Flow (vph) | 1166 | 782 | 533 | 0 | 330 | 11 | 262 | 1048 | 0 | 95 | 1489 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | | |
| Actuated Green, G (s) | 45.0 | 45.0 | 100.0 | | 21.5 | 21.5 | 17.5 | 32.4 | | 8.1 | 22.5 | | |
| Effective Green, g (s) | 45.0 | 45.0 | 100.0 | | 21.5 | 21.5 | 17.5 | 32.4 | | 8.1 | 22.5 | | |
| Actuated g/C Ratio | 0.45 | 0.45 | 1.00 | | 0.22 | 0.22 | 0.18 | 0.32 | | 0.08 | 0.22 | | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | | |
| Lane Grp Cap (vph) | 399 | 782 | 1770 | | 362 | 317 | 289 | 1143 | | 133 | 704 | | |
| v/s Ratio Prot | c0.57 | 0.45 | | | | | c0.16 | c0.30 | | 0.06 | c0.48 | | |
| v/s Ratio Perm | c0.75 | | 0.30 | | 0.20 | 0.01 | | | | | | | |
| v/c Ratio | 2.92 | 1.00 | 0.30 | | 0.91 | 0.04 | 0.91 | 0.92 | | 0.71 | 2.11 | | |
| Uniform Delay, d1 | 27.0 | 27.5 | 0.0 | | 38.3 | 31.0 | 40.4 | 32.5 | | 44.8 | 38.8 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 871.8 | 32.2 | 0.4 | | 26.8 | 0.1 | 29.7 | 12.9 | | 16.6 | 506.5 | | |
| Delay (s) | 898.9 | 59.7 | 0.4 | | 65.1 | 31.1 | 70.2 | 45.5 | | 61.4 | 545.2 | | |
| Level of Service | F | E | A | | E | C | E | D | | E | F | | |
| Approach Delay (s) | | 441.3 | | | 60.5 | | | 50.4 | | | 517.1 | | |
| Approach LOS | | F | | | E | | | D | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 349.4 | | | | | | | | | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | | | 2.35 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 147.8% | | | | | | | | | ICU Level of Service | H |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Monarch Bay Drive & Mulford Point Drive

2035 PM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 478 | 134 | 111 | 93 | 166 | 207 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 520 | 146 | 121 | 101 | 180 | 225 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 665 | 222 | 405 | | | |
| Volume Left (vph) | 520 | 121 | 0 | | | |
| Volume Right (vph) | 146 | 0 | 225 | | | |
| Hadj (s) | 0.06 | 0.14 | -0.30 | | | |
| Departure Headway (s) | 5.9 | 6.7 | 6.0 | | | |
| Degree Utilization, x | 1.0 | 0.41 | 0.67 | | | |
| Capacity (veh/h) | 607 | 523 | 594 | | | |
| Control Delay (s) | 84.9 | 14.4 | 20.4 | | | |
| Approach Delay (s) | 84.9 | 14.4 | 20.4 | | | |
| Approach LOS | F | B | C | | | |
| Intersection Summary | | | | | | |
| Delay | | | 52.6 | | | |
| Level of Service | | | F | | | |
| Intersection Capacity Utilization | | | 77.1% | ICU Level of Service | | D |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis
 20: Monarch Bay Drive & Pescador Point Drive

2035 PM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|-------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Stop | Stop | |
| Volume (vph) | 16 | 14 | 25 | 187 | 214 | 36 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 15 | 27 | 203 | 233 | 39 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | |
| Volume Total (vph) | 33 | 230 | 272 | | | |
| Volume Left (vph) | 17 | 27 | 0 | | | |
| Volume Right (vph) | 15 | 0 | 39 | | | |
| Hadj (s) | -0.14 | 0.06 | -0.05 | | | |
| Departure Headway (s) | 4.8 | 4.3 | 4.2 | | | |
| Degree Utilization, x | 0.04 | 0.28 | 0.31 | | | |
| Capacity (veh/h) | 669 | 816 | 841 | | | |
| Control Delay (s) | 8.1 | 8.9 | 9.1 | | | |
| Approach Delay (s) | 8.1 | 8.9 | 9.1 | | | |
| Approach LOS | A | A | A | | | |
| Intersection Summary | | | | | | |
| Delay | | | 8.9 | | | |
| Level of Service | | | A | | | |
| Intersection Capacity Utilization | | | 38.0% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Signalized Intersection Capacity Analysis
 21: Monarch Bay Drive & Fairway Drive

2035 PM + Project



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|------------------------|-------|------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Volume (vph) | 39 | 139 | 72 | 63 | 145 | 79 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Util. Factor | 1.00 | | 1.00 | | | 1.00 |
| Frt | 0.89 | | 0.94 | | | 1.00 |
| Flt Protected | 0.99 | | 1.00 | | | 0.97 |
| Satd. Flow (prot) | 1648 | | 1746 | | | 1804 |
| Flt Permitted | 0.99 | | 1.00 | | | 0.72 |
| Satd. Flow (perm) | 1648 | | 1746 | | | 1347 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 42 | 151 | 78 | 68 | 158 | 86 |
| RTOR Reduction (vph) | 91 | 0 | 41 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 102 | 0 | 105 | 0 | 0 | 244 |
| Turn Type | Prot | | NA | | Perm | NA |
| Protected Phases | 8 | | 2 | | | 6 |
| Permitted Phases | | | | | 6 | |
| Actuated Green, G (s) | 18.0 | | 18.0 | | | 18.0 |
| Effective Green, g (s) | 18.0 | | 18.0 | | | 18.0 |
| Actuated g/C Ratio | 0.40 | | 0.40 | | | 0.40 |
| Clearance Time (s) | 4.5 | | 4.5 | | | 4.5 |
| Lane Grp Cap (vph) | 659 | | 698 | | | 538 |
| v/s Ratio Prot | c0.06 | | 0.06 | | | |
| v/s Ratio Perm | | | | | | c0.18 |
| v/c Ratio | 0.16 | | 0.15 | | | 0.45 |
| Uniform Delay, d1 | 8.6 | | 8.6 | | | 9.9 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.5 | | 0.5 | | | 2.7 |
| Delay (s) | 9.1 | | 9.1 | | | 12.6 |
| Level of Service | A | | A | | | B |
| Approach Delay (s) | 9.1 | | 9.1 | | | 12.6 |
| Approach LOS | A | | A | | | B |



















Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 10.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.30 | | |
| Actuated Cycle Length (s) | 45.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 41.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 9 | 233 | 20 | 31 | 262 | 44 | 16 | 21 | 23 | 36 | 24 | 24 |
| 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 |
| Hourly flow rate (vph) | 10 | 253 | 22 | 34 | 285 | 48 | 17 | 23 | 25 | 39 | 26 | 26 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 10 | 275 | 366 | 65 | 91 | | | | | | | |
| Volume Left (vph) | 10 | 0 | 34 | 17 | 39 | | | | | | | |
| Volume Right (vph) | 0 | 22 | 48 | 25 | 26 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | -0.03 | -0.14 | -0.05 | | | | | | | |
| Departure Headway (s) | 5.8 | 5.3 | 4.8 | 5.5 | 5.6 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.40 | 0.49 | 0.10 | 0.14 | | | | | | | |
| Capacity (veh/h) | 596 | 658 | 723 | 560 | 569 | | | | | | | |
| Control Delay (s) | 7.7 | 10.6 | 12.4 | 9.1 | 9.5 | | | | | | | |
| Approach Delay (s) | 10.5 | | 12.4 | 9.1 | 9.5 | | | | | | | |
| Approach LOS | B | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 11.1 | | | | | | | | | |
| Level of Service | | | B | | | | | | | | | |
| Intersection Capacity Utilization | | | 49.4% | | ICU Level of Service | | A | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

23: Doolittle Dr & Fairway Drive/Fairway Dr

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 43 | 175 | 110 | 111 | 180 | 367 | 93 | 452 | 156 | 189 | 590 | 77 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 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 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | | 1.00 | 0.98 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1719 | 1259 | 1620 | 1739 | 1316 | 1711 | 2942 | | 1620 | 3021 | |
| Flt Permitted | | 0.90 | 1.00 | 0.53 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1559 | 1259 | 906 | 1739 | 1316 | 1711 | 2942 | | 1620 | 3021 | |
| 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) | 47 | 190 | 120 | 121 | 196 | 399 | 101 | 491 | 170 | 205 | 641 | 84 |
| RTOR Reduction (vph) | 0 | 0 | 90 | 0 | 0 | 298 | 0 | 48 | 0 | 0 | 12 | 0 |
| Lane Group Flow (vph) | 0 | 237 | 30 | 121 | 196 | 101 | 101 | 613 | 0 | 205 | 713 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 15.8 | 15.8 | 15.8 | 15.8 | 15.8 | 7.6 | 18.8 | | 12.8 | 24.0 | |
| Effective Green, g (s) | | 15.8 | 15.8 | 15.8 | 15.8 | 15.8 | 7.6 | 18.8 | | 12.8 | 24.0 | |
| Actuated g/C Ratio | | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.12 | 0.30 | | 0.21 | 0.38 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 394 | 318 | 229 | 440 | 333 | 208 | 886 | | 332 | 1161 | |
| v/s Ratio Prot | | | | | 0.11 | | 0.06 | 0.21 | | c0.13 | c0.24 | |
| v/s Ratio Perm | | c0.15 | 0.02 | 0.13 | | 0.08 | | | | | | |
| v/c Ratio | | 0.60 | 0.10 | 0.53 | 0.45 | 0.30 | 0.49 | 0.69 | | 0.62 | 0.61 | |
| Uniform Delay, d1 | | 20.5 | 17.8 | 20.1 | 19.6 | 18.8 | 25.6 | 19.2 | | 22.6 | 15.5 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 2.6 | 0.1 | 2.2 | 0.7 | 0.5 | 1.8 | 2.5 | | 3.4 | 1.1 | |
| Delay (s) | | 23.1 | 18.0 | 22.3 | 20.3 | 19.4 | 27.4 | 21.8 | | 26.0 | 16.6 | |
| Level of Service | | C | B | C | C | B | C | C | | C | B | |
| Approach Delay (s) | | 21.4 | | | 20.1 | | | 22.5 | | | 18.6 | |
| Approach LOS | | C | | | C | | | C | | | B | |

Intersection Summary

























| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 20.4 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 62.4 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 70.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

24: Merced Street & Fairway Dr

2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 205 | 371 | 133 | 135 | 400 | 87 | 156 | 612 | 155 | 129 | 617 | 159 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3126 | | 1593 | 3127 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1352 | 1652 | 3126 | | 1593 | 3127 | |
| 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) | 223 | 403 | 145 | 147 | 435 | 95 | 170 | 665 | 168 | 140 | 671 | 173 |
| RTOR Reduction (vph) | 0 | 0 | 104 | 0 | 0 | 71 | 0 | 21 | 0 | 0 | 21 | 0 |
| Lane Group Flow (vph) | 223 | 403 | 41 | 147 | 435 | 24 | 170 | 812 | 0 | 140 | 823 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 17.1 | 31.4 | 31.4 | 13.3 | 27.6 | 27.6 | 13.1 | 34.8 | | 11.5 | 33.2 | |
| Effective Green, g (s) | 17.1 | 31.4 | 31.4 | 13.3 | 27.6 | 27.6 | 13.1 | 34.8 | | 11.5 | 33.2 | |
| Actuated g/C Ratio | 0.16 | 0.29 | 0.29 | 0.12 | 0.25 | 0.25 | 0.12 | 0.32 | | 0.10 | 0.30 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 245 | 526 | 372 | 192 | 467 | 339 | 196 | 988 | | 166 | 943 | |
| v/s Ratio Prot | c0.14 | 0.22 | | 0.09 | c0.23 | | 0.10 | c0.26 | | 0.09 | c0.26 | |
| v/s Ratio Perm | | | 0.03 | | | 0.02 | | | | | | |
| v/c Ratio | 0.91 | 0.77 | 0.11 | 0.77 | 0.93 | 0.07 | 0.87 | 0.82 | | 0.84 | 0.87 | |
| Uniform Delay, d1 | 45.7 | 35.9 | 29.0 | 46.8 | 40.3 | 31.4 | 47.6 | 34.7 | | 48.4 | 36.4 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.93 | | 0.78 | 0.83 | |
| Incremental Delay, d2 | 34.9 | 7.0 | 0.2 | 17.4 | 25.8 | 0.1 | 30.4 | 7.3 | | 29.7 | 10.3 | |
| Delay (s) | 80.6 | 42.9 | 29.2 | 64.3 | 66.0 | 31.5 | 75.5 | 39.7 | | 67.6 | 40.7 | |
| Level of Service | F | D | C | E | E | C | E | D | | E | D | |
| Approach Delay (s) | | 51.2 | | | 60.8 | | | 45.7 | | | 44.5 | |
| Approach LOS | | D | | | E | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 49.6 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.91 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 79.0% | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: Garfield/Kaiser West Driveway & Fairway Dr

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|--------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 65 | 538 | 3 | 6 | 414 | 112 | 10 | 0 | 7 | 285 | 0 | 120 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | | 1.00 |
| Frt | 1.00 | 1.00 | | | 0.97 | | | 0.94 | | 1.00 | | 0.85 |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 0.97 | | 0.95 | | 1.00 |
| Satd. Flow (prot) | 1770 | 1861 | | | 3425 | | | 1707 | | 1770 | | 1583 |
| Flt Permitted | 0.95 | 1.00 | | | 0.95 | | | 0.97 | | 0.75 | | 1.00 |
| Satd. Flow (perm) | 1770 | 1861 | | | 3250 | | | 1707 | | 1388 | | 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) | 71 | 585 | 3 | 7 | 450 | 122 | 11 | 0 | 8 | 310 | 0 | 130 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 13 | 0 | 0 | 0 | 91 |
| Lane Group Flow (vph) | 71 | 588 | 0 | 0 | 536 | 0 | 0 | 6 | 0 | 310 | 0 | 39 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | |
| Permitted Phases | | | | | | | 8 | | | 4 | | 4 |
| Actuated Green, G (s) | 4.2 | 32.1 | | | 23.0 | | | 17.7 | | 17.7 | | 17.7 |
| Effective Green, g (s) | 4.2 | 32.1 | | | 23.0 | | | 17.7 | | 17.7 | | 17.7 |
| Actuated g/C Ratio | 0.07 | 0.55 | | | 0.39 | | | 0.30 | | 0.30 | | 0.30 |
| Clearance Time (s) | 4.9 | 4.9 | | | 4.9 | | | 4.0 | | 4.0 | | 4.0 |
| Vehicle Extension (s) | 2.0 | 4.0 | | | 4.0 | | | 4.0 | | 4.0 | | 4.0 |
| Lane Grp Cap (vph) | 126 | 1017 | | | 1273 | | | 514 | | 418 | | 477 |
| v/s Ratio Prot | 0.04 | c0.32 | | | | | | | | | | |
| v/s Ratio Perm | | | | | 0.16 | | | 0.00 | | c0.22 | | 0.02 |
| v/c Ratio | 0.56 | 0.58 | | | 1.72dr | | | 0.01 | | 0.74 | | 0.08 |
| Uniform Delay, d1 | 26.4 | 8.8 | | | 13.0 | | | 14.4 | | 18.4 | | 14.7 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | | 1.00 |
| Incremental Delay, d2 | 3.4 | 1.0 | | | 0.3 | | | 0.0 | | 7.4 | | 0.1 |
| Delay (s) | 29.8 | 9.8 | | | 13.3 | | | 14.4 | | 25.8 | | 14.8 |
| Level of Service | C | A | | | B | | | B | | C | | B |
| Approach Delay (s) | | 11.9 | | | 13.3 | | | 14.4 | | | 22.6 | |
| Approach LOS | | B | | | B | | | B | | | C | |

Intersection Summary

| | | | |
|---|-------|---------------------------|------|
| HCM 2000 Control Delay | 15.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.71 | | |
| Actuated Cycle Length (s) | 58.7 | Sum of lost time (s) | 13.8 |
| Intersection Capacity Utilization | 77.6% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| dr Defacto Right Lane. Recode with 1 though lane as a right lane. | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
26: Miller St & Fairway Dr/Aladdin Ave

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 54 | 676 | 14 | 20 | 553 | 112 | 69 | 3 | 64 | 286 | 4 | 102 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 14 | 12 | 11 | 11 | 11 | 12 | 12 | 12 |
| Total Lost time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.86 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1856 | | 1593 | 1937 | | 1711 | 1542 | | 1770 | 1593 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.68 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 1856 | | 1593 | 1937 | | 1230 | 1542 | | 1770 | 1593 | |
| 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) | 59 | 735 | 15 | 22 | 601 | 122 | 75 | 3 | 70 | 311 | 4 | 111 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 62 | 0 | 0 | 74 | 0 |
| Lane Group Flow (vph) | 59 | 749 | 0 | 22 | 717 | 0 | 75 | 11 | 0 | 311 | 41 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | | | | |
| Parking (#/hr) | | | | | | | | | 0 | | | |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | | | | |
| Actuated Green, G (s) | 6.1 | 41.9 | | 2.6 | 38.4 | | 9.6 | 9.6 | | 15.4 | 29.0 | |
| Effective Green, g (s) | 6.1 | 41.9 | | 2.6 | 38.4 | | 9.6 | 9.6 | | 15.4 | 29.0 | |
| Actuated g/C Ratio | 0.07 | 0.48 | | 0.03 | 0.44 | | 0.11 | 0.11 | | 0.18 | 0.33 | |
| Clearance Time (s) | 4.9 | 4.9 | | 4.9 | 4.9 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 2.0 | 4.0 | | 2.0 | 4.0 | | 4.0 | 4.0 | | 2.0 | 4.0 | |
| Lane Grp Cap (vph) | 123 | 890 | | 47 | 852 | | 135 | 169 | | 312 | 529 | |
| v/s Ratio Prot | c0.03 | c0.40 | | 0.01 | 0.37 | | | 0.01 | | c0.18 | 0.03 | |
| v/s Ratio Perm | | | | | | | c0.06 | | | | | |
| v/c Ratio | 0.48 | 0.84 | | 0.47 | 0.84 | | 0.56 | 0.06 | | 1.00 | 0.08 | |
| Uniform Delay, d1 | 39.1 | 19.8 | | 41.7 | 21.7 | | 36.8 | 34.8 | | 35.9 | 20.0 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.1 | 7.6 | | 2.7 | 7.8 | | 6.0 | 0.2 | | 49.7 | 0.1 | |
| Delay (s) | 40.1 | 27.4 | | 44.3 | 29.6 | | 42.8 | 35.0 | | 85.6 | 20.1 | |
| Level of Service | D | C | | D | C | | D | D | | F | C | |
| Approach Delay (s) | | 28.3 | | | 30.0 | | | 39.0 | | | 67.9 | |
| Approach LOS | | C | | | C | | | D | | | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 37.6 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.84 | | |
| Actuated Cycle Length (s) | 87.3 | Sum of lost time (s) | 17.8 |
| Intersection Capacity Utilization | 73.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Teagarden St & Aladdin Ave

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 117 | 862 | 208 | 3 | 399 | 64 | 69 | 101 | 19 | 67 | 204 | 155 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1964 | | 1711 | 1678 | | 1652 | 1810 | | 1643 | 1777 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.28 | 1.00 | | 0.67 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1964 | | 1711 | 1678 | | 480 | 1810 | | 1164 | 1777 | |
| 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) | 127 | 937 | 226 | 3 | 434 | 70 | 75 | 110 | 21 | 73 | 222 | 168 |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 7 | 0 | 0 | 10 | 0 | 0 | 39 | 0 |
| Lane Group Flow (vph) | 127 | 1153 | 0 | 3 | 497 | 0 | 75 | 121 | 0 | 73 | 351 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | | 4 |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Actuated Green, G (s) | 8.8 | 33.0 | | 1.2 | 25.4 | | 17.8 | 17.8 | | 17.8 | 17.8 | |
| Effective Green, g (s) | 8.8 | 33.0 | | 1.2 | 25.4 | | 17.8 | 17.8 | | 17.8 | 17.8 | |
| Actuated g/C Ratio | 0.14 | 0.51 | | 0.02 | 0.39 | | 0.27 | 0.27 | | 0.27 | 0.27 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 231 | 997 | | 31 | 655 | | 131 | 495 | | 318 | 486 | |
| v/s Ratio Prot | c0.07 | c0.59 | | 0.00 | 0.30 | | | 0.07 | | | c0.20 | |
| v/s Ratio Perm | | | | | | | 0.16 | | | 0.06 | | |
| v/c Ratio | 0.55 | 1.16 | | 0.10 | 0.76 | | 0.57 | 0.24 | | 0.23 | 0.72 | |
| Uniform Delay, d1 | 26.2 | 16.0 | | 31.4 | 17.1 | | 20.3 | 18.4 | | 18.3 | 21.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.3 | 81.9 | | 1.9 | 5.3 | | 7.1 | 0.4 | | 0.5 | 5.6 | |
| Delay (s) | 29.6 | 97.9 | | 33.2 | 22.5 | | 27.4 | 18.7 | | 18.8 | 27.0 | |
| Level of Service | C | F | | C | C | | C | B | | B | C | |
| Approach Delay (s) | | 91.2 | | | 22.5 | | | 21.9 | | | 25.7 | |
| Approach LOS | | F | | | C | | | C | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|--------|---------------------------|------|
| HCM 2000 Control Delay | 59.0 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.01 | | |
| Actuated Cycle Length (s) | 65.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 101.1% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

28: Alvarado St & Aladdin Ave

2035 PM + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 444 | 4 | 538 | 16 | 5 | 12 | 279 | 728 | 1 | 3 | 570 | 121 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | | 1.00 | 0.89 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1499 | | 1652 | 1529 | | 1652 | 3240 | 1440 | 1711 | 3278 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1499 | | 1652 | 1529 | | 1652 | 3240 | 1440 | 1711 | 3278 | |
| 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) | 483 | 4 | 585 | 17 | 5 | 13 | 303 | 791 | 1 | 3 | 620 | 132 |
| RTOR Reduction (vph) | 0 | 266 | 0 | 0 | 11 | 0 | 0 | 0 | 1 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 483 | 323 | 0 | 17 | 7 | 0 | 303 | 791 | 0 | 3 | 738 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 32.1 | 43.8 | | 1.9 | 13.6 | | 19.1 | 47.3 | 47.3 | 0.7 | 28.9 | |
| Effective Green, g (s) | 32.1 | 43.8 | | 1.9 | 13.6 | | 19.1 | 47.3 | 47.3 | 0.7 | 28.9 | |
| Actuated g/C Ratio | 0.29 | 0.40 | | 0.02 | 0.12 | | 0.17 | 0.43 | 0.43 | 0.01 | 0.26 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 481 | 595 | | 28 | 188 | | 286 | 1390 | 618 | 10 | 859 | |
| v/s Ratio Prot | c0.29 | c0.22 | | 0.01 | 0.00 | | c0.18 | 0.24 | | 0.00 | c0.23 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 1.00 | 0.54 | | 0.61 | 0.04 | | 1.06 | 0.57 | 0.00 | 0.30 | 0.86 | |
| Uniform Delay, d1 | 39.0 | 25.5 | | 53.8 | 42.5 | | 45.5 | 23.8 | 18.0 | 54.5 | 38.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 42.1 | 1.8 | | 44.5 | 0.2 | | 69.8 | 0.9 | 0.0 | 32.2 | 9.4 | |
| Delay (s) | 81.1 | 27.3 | | 98.2 | 42.7 | | 115.3 | 24.6 | 18.0 | 86.7 | 48.1 | |
| Level of Service | F | C | | F | D | | F | C | B | F | D | |
| Approach Delay (s) | | 51.5 | | | 69.7 | | | 49.7 | | | 48.2 | |
| Approach LOS | | D | | | E | | | D | | | D | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 50.2 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.92 | | |
| Actuated Cycle Length (s) | 110.2 | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 79.2% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 29: Merced Street/Merced St & Wells Fargo driveway

2035 PM + Project
























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|------|-------|------|------|------|-------|------|------|
| Lane Configurations | | ↕ | | | ↕ | ↗ | ↖ | ↑↑↑ | | ↖ | ↗ | |
| Volume (vph) | 3 | 0 | 0 | 20 | 0 | 78 | 0 | 1655 | 43 | 98 | 1140 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 9 | 9 | 10 | 10 | 12 | 16 | 10 | 12 | 16 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.91 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 0.98 | | 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 | 1.00 | |
| Flt Protected | | 0.95 | | | 0.95 | 1.00 | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1770 | | | 1562 | 1397 | | 4932 | | 1619 | 3470 | |
| Flt Permitted | | 0.74 | | | 0.76 | 1.00 | | 1.00 | | 0.10 | 1.00 | |
| Satd. Flow (perm) | | 1384 | | | 1243 | 1397 | | 4932 | | 177 | 3470 | |
| 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) | 3 | 0 | 0 | 22 | 0 | 85 | 0 | 1799 | 47 | 107 | 1239 | 2 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 2 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 3 | 0 | 0 | 22 | 52 | 0 | 1844 | 0 | 107 | 1241 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | 2 | | 2 | 2 | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 4 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 4 | | 4 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 10.2 | | | 10.2 | 10.2 | | 91.2 | | 91.2 | 91.2 | |
| Effective Green, g (s) | | 10.2 | | | 10.2 | 10.2 | | 91.2 | | 91.2 | 91.2 | |
| Actuated g/C Ratio | | 0.09 | | | 0.09 | 0.09 | | 0.83 | | 0.83 | 0.83 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | 4.0 | | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | 128 | | | 115 | 129 | | 4089 | | 146 | 2876 | |
| v/s Ratio Prot | | | | | | | | 0.37 | | | 0.36 | |
| v/s Ratio Perm | | 0.00 | | | 0.02 | c0.04 | | | | c0.61 | | |
| v/c Ratio | | 0.02 | | | 0.19 | 0.41 | | 0.45 | | 0.73 | 0.43 | |
| Uniform Delay, d1 | | 45.4 | | | 46.1 | 47.0 | | 2.6 | | 4.1 | 2.5 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 0.46 | | 1.96 | 0.36 | |
| Incremental Delay, d2 | | 0.1 | | | 0.8 | 2.1 | | 0.2 | | 3.0 | 0.0 | |
| Delay (s) | | 45.4 | | | 46.9 | 49.1 | | 1.4 | | 11.0 | 0.9 | |
| Level of Service | | D | | | D | D | | A | | B | A | |
| Approach Delay (s) | | 45.4 | | | 48.7 | | | 1.4 | | | 1.7 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 3.1 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.70 | A |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 54.2% | 8.6 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | A |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 30: Merced Street & Republic Ave

2035 PM + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|----------------------|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | | |
| Lane Configurations | |  | | |  |  |  |  |  |  |  |  | | |
| Volume (vph) | 56 | 8 | 22 | 141 | 9 | 797 | 2 | 1084 | 173 | 396 | 830 | 41 | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | |
| Lane Width | 16 | 12 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | | |
| Total Lost time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 0.88 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | | | |
| Frbp, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Frt | | 0.97 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | | | |
| Flt Protected | | 0.97 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (prot) | | 1705 | | | 1779 | 2787 | 1736 | 3471 | 1583 | 3433 | 3442 | | | |
| Flt Permitted | | 0.66 | | | 0.69 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | | |
| Satd. Flow (perm) | | 1164 | | | 1276 | 2787 | 1736 | 3471 | 1583 | 3433 | 3442 | | | |
| 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) | 61 | 9 | 24 | 153 | 10 | 866 | 2 | 1178 | 188 | 430 | 902 | 45 | | |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 0 | 687 | 0 | 0 | 66 | 0 | 2 | 0 | | |
| Lane Group Flow (vph) | 0 | 82 | 0 | 0 | 163 | 179 | 2 | 1178 | 122 | 430 | 945 | 0 | | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | | | | 2 | | |
| Confl. Bikes (#/hr) | | | 4 | | | | | | | | | | | |
| Heavy Vehicles (%) | 4% | 2% | 4% | 2% | 2% | 2% | 4% | 4% | 2% | 2% | 4% | 4% | | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| Parking (#/hr) | 0 | | 0 | | | | | | | | | | | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Prot | NA | Perm | Prot | NA | | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | | 6 | | |
| Permitted Phases | 4 | | | 8 | | 8 | | | 2 | | | | | |
| Actuated Green, G (s) | | 22.8 | | | 22.8 | 22.8 | 1.2 | 42.4 | 42.4 | 31.3 | 72.5 | | | |
| Effective Green, g (s) | | 22.8 | | | 22.8 | 22.8 | 1.2 | 42.4 | 42.4 | 31.3 | 72.5 | | | |
| Actuated g/C Ratio | | 0.21 | | | 0.21 | 0.21 | 0.01 | 0.39 | 0.39 | 0.28 | 0.66 | | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | | 241 | | | 264 | 577 | 18 | 1337 | 610 | 976 | 2268 | | | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.34 | | 0.13 | c0.27 | | | |
| v/s Ratio Perm | | 0.07 | | | c0.13 | 0.06 | | | 0.08 | | | | | |
| v/c Ratio | | 0.34 | | | 0.62 | 0.31 | 0.11 | 0.88 | 0.20 | 0.44 | 0.42 | | | |
| Uniform Delay, d1 | | 37.2 | | | 39.6 | 36.9 | 53.9 | 31.5 | 22.5 | 32.2 | 8.8 | | | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.36 | 0.55 | 0.32 | 0.34 | 0.18 | | | |
| Incremental Delay, d2 | | 0.8 | | | 4.3 | 0.3 | 2.3 | 7.3 | 0.6 | 0.3 | 0.5 | | | |
| Delay (s) | | 38.0 | | | 43.9 | 37.3 | 75.8 | 24.7 | 7.8 | 11.3 | 2.1 | | | |
| Level of Service | | D | | | D | D | E | C | A | B | A | | | |
| Approach Delay (s) | | 38.0 | | | 38.3 | | | 22.5 | | | 5.0 | | | |
| Approach LOS | | D | | | D | | | C | | | A | | | |
| Intersection Summary | | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.8 | | | | | | | | | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | | | 0.68 | | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | 13.5 | | | |
| Intersection Capacity Utilization | | | 74.1% | | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

31: Merced St/Merced Street & West Ave 140th

2035 PM + Project



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | | | | | | |
| Volume (vph) | 46 | 41 | 14 | 891 | 799 | 29 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1330 | 1652 | 3240 | 3222 | |
| Flt Permitted | 0.95 | 1.00 | 0.32 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1330 | 550 | 3240 | 3222 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 50 | 45 | 15 | 968 | 868 | 32 |
| RTOR Reduction (vph) | 0 | 41 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 50 | 4 | 15 | 968 | 896 | 0 |
| Confl. Peds. (#/hr) | 2 | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 4 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 4% | 2% |
| Parking (#/hr) | | 0 | | | | |
| Turn Type | Prot | Perm | Perm | NA | NA | |
| Protected Phases | 5 | | | 2 | 6 | |
| Permitted Phases | | 5 | 2 | | | |
| Actuated Green, G (s) | 5.0 | 5.0 | 41.0 | 41.0 | 41.0 | |
| Effective Green, g (s) | 5.0 | 5.0 | 41.0 | 41.0 | 41.0 | |
| Actuated g/C Ratio | 0.09 | 0.09 | 0.75 | 0.75 | 0.75 | |
| Clearance Time (s) | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 6.0 | 6.0 | 6.0 | |
| Lane Grp Cap (vph) | 150 | 120 | 410 | 2415 | 2401 | |
| v/s Ratio Prot | c0.03 | | | c0.30 | 0.28 | |
| v/s Ratio Perm | | 0.00 | 0.03 | | | |
| v/c Ratio | 0.33 | 0.03 | 0.04 | 0.40 | 0.37 | |
| Uniform Delay, d1 | 23.4 | 22.8 | 1.8 | 2.5 | 2.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.38 | |
| Incremental Delay, d2 | 1.3 | 0.1 | 0.2 | 0.5 | 0.3 | |
| Delay (s) | 24.8 | 22.9 | 2.0 | 3.0 | 1.2 | |
| Level of Service | C | C | A | A | A | |
| Approach Delay (s) | 23.9 | | | 3.0 | 1.2 | |
| Approach LOS | C | | | A | A | |

Intersection Summary































| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 3.2 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 35.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2035 + Project Saturday

















HCM Signalized Intersection Capacity Analysis
1: Doolittle Dr & Davis St

2035 SAT + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|--|---|--|---|---|---|---|---|--|--|--|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |   | |   |  |  |  |    |  |   |   |   |
| Volume (vph) | 12 | 76 | 14 | 191 | 81 | 407 | 17 | 299 | 356 | 605 | 400 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 10 | 10 | 11 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 12 |
| Total Lost time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1678 | 3115 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1435 | 3143 | 3206 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1678 | 3115 | | 3255 | 1689 | 1491 | 1620 | 4655 | 1435 | 3143 | 3206 | |
| 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) | 13 | 83 | 15 | 208 | 88 | 442 | 18 | 325 | 387 | 658 | 435 | 27 |
| RTOR Reduction (vph) | 0 | 13 | 0 | 0 | 0 | 205 | 0 | 0 | 238 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 13 | 85 | 0 | 208 | 88 | 237 | 18 | 325 | 149 | 658 | 459 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 6% | 4% | 4% | 5% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | 5 | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | | | | 4 | | | 6 | | | |
| Actuated Green, G (s) | 0.8 | 11.1 | | 10.2 | 20.5 | 40.4 | 3.9 | 18.8 | 29.0 | 19.9 | 34.8 | |
| Effective Green, g (s) | 0.8 | 11.1 | | 10.2 | 20.5 | 40.4 | 3.9 | 18.8 | 29.0 | 19.9 | 34.8 | |
| Actuated g/C Ratio | 0.01 | 0.15 | | 0.14 | 0.27 | 0.54 | 0.05 | 0.25 | 0.39 | 0.26 | 0.46 | |
| Clearance Time (s) | 3.5 | 3.8 | | 3.5 | 3.8 | 3.5 | 3.5 | 4.5 | 3.5 | 3.5 | 4.5 | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 2.0 | 2.0 | 4.0 | 2.0 | 2.0 | 4.5 | |
| Lane Grp Cap (vph) | 17 | 459 | | 440 | 459 | 799 | 83 | 1162 | 552 | 830 | 1481 | |
| v/s Ratio Prot | 0.01 | 0.03 | | c0.06 | 0.05 | c0.08 | 0.01 | c0.07 | 0.04 | c0.21 | c0.14 | |
| v/s Ratio Perm | | | | | | 0.08 | | | 0.07 | | | |
| v/c Ratio | 0.76 | 0.19 | | 0.47 | 0.19 | 0.30 | 0.22 | 0.28 | 0.27 | 0.79 | 0.31 | |
| Uniform Delay, d1 | 37.2 | 28.1 | | 30.1 | 21.0 | 9.6 | 34.2 | 22.8 | 15.9 | 25.8 | 12.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 99.4 | 0.2 | | 0.3 | 0.2 | 0.1 | 0.5 | 0.2 | 0.1 | 4.9 | 0.2 | |
| Delay (s) | 136.6 | 28.3 | | 30.4 | 21.2 | 9.7 | 34.7 | 23.0 | 16.0 | 30.7 | 12.9 | |
| Level of Service | F | C | | C | C | A | C | C | B | C | B | |
| Approach Delay (s) | | 41.0 | | | 16.9 | | | 19.6 | | | 23.3 | |
| Approach LOS | | D | | | B | | | B | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.3 | HCM 2000 Level of Service | | | | C | | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.51 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 75.3 | Sum of lost time (s) | | | | 15.3 | | | | |
| Intersection Capacity Utilization | | | 52.9% | ICU Level of Service | | | | A | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

























HCM Unsignalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2035 SAT + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 24 | 400 | 14 | 23 | 602 | 18 | 19 | 18 | 39 | 14 | 18 | 24 |
| 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 |
| Hourly flow rate (vph) | 26 | 435 | 15 | 25 | 654 | 20 | 21 | 20 | 42 | 15 | 20 | 26 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 476 | 699 | 83 | 61 | | | | | | | | |
| Volume Left (vph) | 26 | 25 | 21 | 15 | | | | | | | | |
| Volume Right (vph) | 15 | 20 | 42 | 26 | | | | | | | | |
| Hadj (s) | 0.03 | 0.02 | -0.22 | -0.17 | | | | | | | | |
| Departure Headway (s) | 5.4 | 5.1 | 6.7 | 6.9 | | | | | | | | |
| Degree Utilization, x | 0.71 | 0.99 | 0.15 | 0.12 | | | | | | | | |
| Capacity (veh/h) | 476 | 697 | 502 | 484 | | | | | | | | |
| Control Delay (s) | 20.5 | 54.2 | 11.0 | 10.8 | | | | | | | | |
| Approach Delay (s) | 20.5 | 54.2 | 11.0 | 10.8 | | | | | | | | |
| Approach LOS | C | F | B | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 37.3 | | | | | | | | | |
| Level of Service | | | E | | | | | | | | | |
| Intersection Capacity Utilization | | | 52.6% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd































2035 SAT + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 188 | 301 | 53 | 206 | 458 | 173 | 50 | 282 | 192 | 154 | 284 | 233 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1451 | 1620 | 1739 | 1399 | 1652 | 3240 | 1332 | 1620 | 2859 | 2859 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1739 | 1451 | 1620 | 1739 | 1399 | 1652 | 3240 | 1332 | 1620 | 2859 | 2859 | |
| 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) | 204 | 327 | 58 | 224 | 498 | 188 | 54 | 307 | 209 | 167 | 309 | 253 | |
| RTOR Reduction (vph) | 0 | 0 | 43 | 0 | 0 | 97 | 0 | 0 | 171 | 0 | 117 | 0 | |
| Lane Group Flow (vph) | 204 | 327 | 15 | 224 | 498 | 91 | 54 | 307 | 38 | 167 | 445 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | 8 | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 18.0 | 24.6 | 24.6 | 19.6 | 26.2 | 26.2 | 8.1 | 17.8 | 17.8 | 16.7 | 26.4 | 26.4 | |
| Effective Green, g (s) | 18.0 | 24.6 | 24.6 | 19.6 | 26.2 | 26.2 | 8.1 | 17.8 | 17.8 | 16.7 | 26.4 | 26.4 | |
| Actuated g/C Ratio | 0.19 | 0.25 | 0.25 | 0.20 | 0.27 | 0.27 | 0.08 | 0.18 | 0.18 | 0.17 | 0.27 | 0.27 | |
| Clearance Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 307 | 442 | 369 | 328 | 471 | 379 | 138 | 596 | 245 | 279 | 780 | 780 | |
| v/s Ratio Prot | 0.12 | 0.19 | | c0.14 | c0.29 | | 0.03 | 0.09 | | c0.10 | c0.16 | c0.16 | |
| v/s Ratio Perm | | | 0.01 | | | 0.07 | | | 0.03 | | | | |
| v/c Ratio | 0.66 | 0.74 | 0.04 | 0.68 | 1.06 | 0.24 | 0.39 | 0.52 | 0.16 | 0.60 | 0.57 | 0.57 | |
| Uniform Delay, d1 | 36.5 | 33.1 | 27.2 | 35.7 | 35.2 | 27.5 | 42.0 | 35.6 | 33.1 | 36.9 | 30.3 | 30.3 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.9 | 6.8 | 0.1 | 6.3 | 57.4 | 0.4 | 2.5 | 1.0 | 0.4 | 4.0 | 1.2 | 1.2 | |
| Delay (s) | 42.4 | 39.9 | 27.2 | 41.9 | 92.7 | 27.9 | 44.5 | 36.6 | 33.6 | 40.9 | 31.5 | 31.5 | |
| Level of Service | D | D | C | D | F | C | D | D | C | D | C | C | |
| Approach Delay (s) | | 39.5 | | | 66.8 | | | 36.2 | | | 33.6 | | |
| Approach LOS | | D | | | E | | | D | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 46.2 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.80 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 96.7 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 70.0% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: Merced St & Marina Blvd

2035 SAT + Project

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|--|---|--|--|---|--|--|--|--|--|--|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |   | |   |   | |  |   |   |   |   |   | |
| Volume (vph) | 45 | 629 | 107 | 905 | 656 | 107 | 207 | 237 | 762 | 167 | 167 | 42 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4554 | | 3255 | 3164 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1470 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4554 | | 3255 | 3164 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1470 | |
| 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) | 49 | 684 | 116 | 984 | 713 | 116 | 225 | 258 | 828 | 182 | 182 | 46 | |
| RTOR Reduction (vph) | 0 | 17 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | |
| Lane Group Flow (vph) | 49 | 783 | 0 | 984 | 820 | 0 | 225 | 258 | 828 | 182 | 182 | 8 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 9.1 | 27.9 | | 46.0 | 64.8 | | 21.0 | 31.0 | 77.0 | 13.0 | 23.0 | 23.0 | |
| Effective Green, g (s) | 9.1 | 29.4 | | 46.0 | 66.3 | | 21.0 | 32.5 | 77.0 | 13.0 | 24.5 | 24.5 | |
| Actuated g/C Ratio | 0.07 | 0.21 | | 0.34 | 0.48 | | 0.15 | 0.24 | 0.56 | 0.09 | 0.18 | 0.18 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 103 | 977 | | 1093 | 1532 | | 257 | 796 | 1522 | 309 | 579 | 263 | |
| v/s Ratio Prot | 0.03 | c0.17 | | c0.30 | 0.26 | | c0.13 | 0.08 | c0.31 | c0.06 | 0.06 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.01 | |
| v/c Ratio | 0.48 | 0.80 | | 0.90 | 0.54 | | 0.88 | 0.32 | 0.54 | 0.59 | 0.31 | 0.03 | |
| Uniform Delay, d1 | 61.6 | 51.0 | | 43.3 | 24.6 | | 56.7 | 43.1 | 18.9 | 59.4 | 48.9 | 46.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.7 | 5.1 | | 11.8 | 0.5 | | 31.5 | 0.3 | 0.5 | 8.0 | 0.4 | 0.1 | |
| Delay (s) | 66.3 | 56.0 | | 55.0 | 25.0 | | 88.2 | 43.5 | 19.4 | 67.4 | 49.3 | 46.5 | |
| Level of Service | E | E | | E | C | | F | D | B | E | D | D | |
| Approach Delay (s) | | 56.6 | | | 41.3 | | | 35.9 | | | 57.0 | | |
| Approach LOS | | E | | | D | | | D | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 44.1 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.80 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 136.9 | | | | | | | | | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | | | 84.3% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Kaiser North/South Access Road & Marina Blvd

2035 SAT + Project



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|------------------------|-------|------|-------|------|------|------|
| Lane Configurations | ↑↑↑↑ | | ↖ | ↑↑ | | ↗ |
| Volume (vph) | 1513 | 89 | 472 | 0 | 0 | 417 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 10 | 12 | 12 |
| Total Lost time (s) | 5.5 | | 4.0 | | | 4.0 |
| Lane Util. Factor | 0.86 | | 1.00 | | | 1.00 |
| Frt | 0.99 | | 1.00 | | | 0.86 |
| Flt Protected | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (prot) | 6354 | | 1770 | | | 1611 |
| Flt Permitted | 1.00 | | 0.95 | | | 1.00 |
| Satd. Flow (perm) | 6354 | | 1770 | | | 1611 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1645 | 97 | 513 | 0 | 0 | 453 |
| RTOR Reduction (vph) | 15 | 0 | 0 | 0 | 0 | 2 |
| Lane Group Flow (vph) | 1727 | 0 | 513 | 0 | 0 | 451 |
| Turn Type | NA | | Prot | | | Over |
| Protected Phases | 2 | | 1 | 6 | | 1 |
| Permitted Phases | | | | | | |
| Actuated Green, G (s) | 21.7 | | 18.8 | | | 18.8 |
| Effective Green, g (s) | 21.7 | | 18.8 | | | 18.8 |
| Actuated g/C Ratio | 0.43 | | 0.38 | | | 0.38 |
| Clearance Time (s) | 5.5 | | 4.0 | | | 4.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | 2757 | | 665 | | | 605 |
| v/s Ratio Prot | c0.27 | | c0.29 | | | 0.28 |
| v/s Ratio Perm | | | | | | |
| v/c Ratio | 0.63 | | 0.77 | | | 0.74 |
| Uniform Delay, d1 | 11.0 | | 13.7 | | | 13.5 |
| Progression Factor | 1.00 | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | 0.5 | | 5.5 | | | 5.0 |
| Delay (s) | 11.4 | | 19.2 | | | 18.5 |
| Level of Service | B | | B | | | B |
| Approach Delay (s) | 11.4 | | | 19.2 | 18.5 | |
| Approach LOS | B | | | B | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 14.1 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.69 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 9.5 |
| Intersection Capacity Utilization | 57.5% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035 SAT + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|-------|------|------|------|------|------|------|-------|---------------------------|------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1251 | 633 | 476 | 989 | 0 | 0 | 0 | 501 | 0 | 0 | 1077 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1360 | 688 | 517 | 1075 | 0 | 0 | 0 | 545 | 0 | 0 | 1171 | |
| RTOR Reduction (vph) | 0 | 0 | 347 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150 | |
| Lane Group Flow (vph) | 0 | 1360 | 341 | 517 | 1075 | 0 | 0 | 0 | 545 | 0 | 0 | 1021 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 1 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 47.2 | 47.2 | 16.5 | 70.7 | | | | 32.5 | | | 32.5 | |
| Effective Green, g (s) | | 47.2 | 47.2 | 16.5 | 70.7 | | | | 32.5 | | | 32.5 | |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.15 | 0.64 | | | | 0.30 | | | 0.30 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1443 | 1136 | 472 | 2162 | | | | 863 | | | 825 | |
| v/s Ratio Prot | | c0.41 | | c0.16 | 0.32 | | | | 0.19 | | | c0.37 | |
| v/s Ratio Perm | | | 0.13 | | | | | | | | | | |
| v/c Ratio | | 0.94 | 0.30 | 1.10 | 0.50 | | | | 0.63 | | | 1.24 | |
| Uniform Delay, d1 | | 29.9 | 20.4 | 46.6 | 10.2 | | | | 33.4 | | | 38.6 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 12.5 | 0.1 | 69.8 | 0.2 | | | | 1.5 | | | 117.3 | |
| Delay (s) | | 42.4 | 20.6 | 116.4 | 10.4 | | | | 34.9 | | | 155.9 | |
| Level of Service | | D | C | F | B | | | | C | | | F | |
| Approach Delay (s) | | 35.1 | | | 44.8 | | | 34.9 | | | 155.9 | | |
| Approach LOS | | D | | | D | | | C | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 64.4 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 1.07 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 109.7 | | | | | | | | | Sum of lost time (s) | 13.5 |
| Intersection Capacity Utilization | | | 72.1% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 15: Marina Blvd & I-880 NB Ramps

2035 SAT + Project





















| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|------|------|-------|------|------|
| Lane Configurations | ↖ | ↑↑↑ | ↑↑ | ↗ | | |
| Volume (vph) | 513 | 0 | 1006 | 556 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 11 | 12 | 11 |
| Total Lost time (s) | 4.5 | | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | | 0.95 | 1.00 | | |
| Frt | 1.00 | | 1.00 | 0.85 | | |
| Flt Protected | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (prot) | 1620 | | 3355 | 1531 | | |
| Flt Permitted | 0.95 | | 1.00 | 1.00 | | |
| Satd. Flow (perm) | 1620 | | 3355 | 1531 | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 558 | 0 | 1093 | 604 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 84 | 0 | 0 |
| Lane Group Flow (vph) | 558 | 0 | 1093 | 520 | 0 | 0 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 2% | 2% | 4% |
| Turn Type | Prot | | NA | Perm | | |
| Protected Phases | 5 | 2 | 6 | | | |
| Permitted Phases | | | | 6 | | |
| Actuated Green, G (s) | 19.8 | | 23.3 | 23.3 | | |
| Effective Green, g (s) | 19.8 | | 23.3 | 23.3 | | |
| Actuated g/C Ratio | 0.38 | | 0.45 | 0.45 | | |
| Clearance Time (s) | 4.5 | | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | | |
| Lane Grp Cap (vph) | 615 | | 1500 | 684 | | |
| v/s Ratio Prot | c0.34 | | 0.33 | | | |
| v/s Ratio Perm | | | | c0.34 | | |
| v/c Ratio | 0.91 | | 0.73 | 0.76 | | |
| Uniform Delay, d1 | 15.3 | | 11.8 | 12.1 | | |
| Progression Factor | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 17.1 | | 1.8 | 5.0 | | |
| Delay (s) | 32.4 | | 13.6 | 17.0 | | |
| Level of Service | C | | B | B | | |
| Approach Delay (s) | | 32.4 | 14.8 | | 0.0 | |
| Approach LOS | | C | B | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 19.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.83 | | |
| Actuated Cycle Length (s) | 52.1 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 70.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

HCM Unsignalized Intersection Capacity Analysis
 22: Aurora Drive & Fairway Drive

2035 SAT + Project

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | | |  | | |  |  |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 13 | 213 | 19 | 24 | 239 | 24 | 26 | 18 | 32 | 16 | 9 | 15 |
| 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 |
| Hourly flow rate (vph) | 14 | 232 | 21 | 26 | 260 | 26 | 28 | 20 | 35 | 17 | 10 | 16 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | SB 1 | | | | | | | |
| Volume Total (vph) | 14 | 252 | 312 | 83 | 43 | | | | | | | |
| Volume Left (vph) | 14 | 0 | 26 | 28 | 17 | | | | | | | |
| Volume Right (vph) | 0 | 21 | 26 | 35 | 16 | | | | | | | |
| Hadj (s) | 0.53 | -0.02 | 0.00 | -0.15 | -0.11 | | | | | | | |
| Departure Headway (s) | 5.7 | 5.1 | 4.7 | 5.2 | 5.3 | | | | | | | |
| Degree Utilization, x | 0.02 | 0.36 | 0.41 | 0.12 | 0.06 | | | | | | | |
| Capacity (veh/h) | 618 | 684 | 743 | 620 | 595 | | | | | | | |
| Control Delay (s) | 7.6 | 9.7 | 10.8 | 8.9 | 8.7 | | | | | | | |
| Approach Delay (s) | 9.6 | | 10.8 | 8.9 | 8.7 | | | | | | | |
| Approach LOS | A | | B | A | A | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 10.0 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 43.0% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
23: Doolittle Dr & Fairway Drive/Fairway Dr

2035 SAT + Project



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations | | ↕ | ↗ | ↖ | ↕ | ↗ | ↖ | ↕↗ | | ↖ | ↕↗ | |
| Volume (vph) | 61 | 162 | 83 | 67 | 180 | 187 | 101 | 300 | 74 | 117 | 286 | 65 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 10 |
| Total Lost time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.97 | |
| Flt Protected | | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1712 | 1260 | 1620 | 1739 | 1319 | 1711 | 2974 | | 1620 | 2988 | |
| Flt Permitted | | 0.86 | 1.00 | 0.58 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1490 | 1260 | 992 | 1739 | 1319 | 1711 | 2974 | | 1620 | 2988 | |
| 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) | 66 | 176 | 90 | 73 | 196 | 203 | 110 | 326 | 80 | 127 | 311 | 71 |
| RTOR Reduction (vph) | 0 | 0 | 63 | 0 | 0 | 143 | 0 | 32 | 0 | 0 | 28 | 0 |
| Lane Group Flow (vph) | 0 | 242 | 27 | 73 | 196 | 60 | 110 | 374 | 0 | 127 | 354 | 0 |
| Confl. Peds. (#/hr) | 14 | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | 0 | | | 0 | | 0 | 0 | | 0 | 0 |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | | 15.4 | 15.4 | 15.4 | 15.4 | 15.4 | 7.2 | 13.6 | | 7.9 | 14.3 | |
| Effective Green, g (s) | | 15.4 | 15.4 | 15.4 | 15.4 | 15.4 | 7.2 | 13.6 | | 7.9 | 14.3 | |
| Actuated g/C Ratio | | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.14 | 0.26 | | 0.15 | 0.28 | |
| Clearance Time (s) | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 | |
| Lane Grp Cap (vph) | | 442 | 373 | 294 | 516 | 391 | 237 | 779 | | 246 | 823 | |
| v/s Ratio Prot | | | | | 0.11 | | 0.06 | c0.13 | | c0.08 | 0.12 | |
| v/s Ratio Perm | | c0.16 | 0.02 | 0.07 | | 0.05 | | | | | | |
| v/c Ratio | | 0.55 | 0.07 | 0.25 | 0.38 | 0.15 | 0.46 | 0.48 | | 0.52 | 0.43 | |
| Uniform Delay, d1 | | 15.3 | 13.1 | 13.9 | 14.5 | 13.4 | 20.6 | 16.2 | | 20.2 | 15.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.4 | 0.1 | 0.4 | 0.5 | 0.2 | 1.4 | 0.6 | | 1.8 | 0.5 | |
| Delay (s) | | 16.7 | 13.2 | 14.3 | 14.9 | 13.6 | 22.0 | 16.8 | | 22.1 | 15.9 | |
| Level of Service | | B | B | B | B | B | C | B | | C | B | |
| Approach Delay (s) | | 15.8 | | | 14.3 | | | 17.9 | | | 17.5 | |
| Approach LOS | | B | | | B | | | B | | | B | |

























Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 16.5 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.52 | | |
| Actuated Cycle Length (s) | 51.9 | Sum of lost time (s) | 15.0 |
| Intersection Capacity Utilization | 60.2% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Merced Street & Fairway Dr

2035 SAT + Project

















| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph) | 124 | 215 | 104 | 83 | 298 | 86 | 111 | 494 | 87 | 72 | 473 | 108 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 12 | 8 | 9 | 12 | 8 | 10 | 10 | 10 | 9 | 10 | 10 |
| Total Lost time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 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 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1577 | 1845 | 1306 | 1593 | 1863 | 1351 | 1652 | 3155 | | 1593 | 3136 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1577 | 1845 | 1306 | 1593 | 1863 | 1351 | 1652 | 3155 | | 1593 | 3136 | |
| 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) | 135 | 234 | 113 | 90 | 324 | 93 | 121 | 537 | 95 | 78 | 514 | 117 |
| RTOR Reduction (vph) | 0 | 0 | 85 | 0 | 0 | 70 | 0 | 9 | 0 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 135 | 234 | 28 | 90 | 324 | 23 | 121 | 623 | 0 | 78 | 617 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | 8 | | | 4 | | | | | | |
| Actuated Green, G (s) | 16.0 | 28.5 | 28.5 | 16.3 | 28.8 | 28.8 | 13.0 | 43.3 | | 9.6 | 39.9 | |
| Effective Green, g (s) | 16.0 | 28.5 | 28.5 | 16.3 | 28.8 | 28.8 | 13.0 | 43.3 | | 9.6 | 39.9 | |
| Actuated g/C Ratio | 0.14 | 0.24 | 0.24 | 0.14 | 0.25 | 0.25 | 0.11 | 0.37 | | 0.08 | 0.34 | |
| Clearance Time (s) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | | 4.6 | 4.6 | |
| Vehicle Extension (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 6.0 | | 4.0 | 6.0 | |
| Lane Grp Cap (vph) | 216 | 450 | 318 | 222 | 459 | 333 | 184 | 1170 | | 131 | 1072 | |
| v/s Ratio Prot | c0.09 | 0.13 | | 0.06 | c0.17 | | c0.07 | 0.20 | | 0.05 | c0.20 | |
| v/s Ratio Perm | | | 0.02 | | | 0.02 | | | | | | |
| v/c Ratio | 0.62 | 0.52 | 0.09 | 0.41 | 0.71 | 0.07 | 0.66 | 0.53 | | 0.60 | 0.58 | |
| Uniform Delay, d1 | 47.5 | 38.2 | 34.1 | 45.8 | 40.1 | 33.7 | 49.7 | 28.8 | | 51.7 | 31.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.3 | 1.4 | 0.2 | 1.6 | 5.3 | 0.1 | 9.1 | 1.7 | | 8.2 | 1.5 | |
| Delay (s) | 53.8 | 39.6 | 34.2 | 47.4 | 45.3 | 33.8 | 58.8 | 30.5 | | 59.9 | 33.0 | |
| Level of Service | D | D | C | D | D | C | E | C | | E | C | |
| Approach Delay (s) | | 42.3 | | | 43.6 | | | 35.0 | | | 35.9 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 38.5 | | | | HCM 2000 Level of Service | | | | D | |
| HCM 2000 Volume to Capacity ratio | | | 0.63 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 116.7 | | | Sum of lost time (s) | | | | 19.0 | | |
| Intersection Capacity Utilization | | | 64.2% | | | ICU Level of Service | | | | C | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

Appendix 5 Intersection Level of Service
Worksheets - Mitigated

Baseline + Project Mitigated
AM

HCM Signalized Intersection Capacity Analysis
10: Aurora Drive & Marina Boulevard

Baseline + Project AM Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|-----|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  | | |  | | |  | | |
| Volume (vph) | 49 | 301 | 13 | 23 | 571 | 79 | 16 | 131 | 51 | 43 | 52 | 26 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Frt | | 1.00 | | | 0.98 | | | 0.97 | | | 0.97 | | |
| Flt Protected | | 0.99 | | | 1.00 | | | 1.00 | | | 0.98 | | |
| Satd. Flow (prot) | | 1841 | | | 1830 | | | 1791 | | | 1778 | | |
| Flt Permitted | | 0.87 | | | 0.98 | | | 0.97 | | | 0.86 | | |
| Satd. Flow (perm) | | 1604 | | | 1800 | | | 1746 | | | 1561 | | |
| 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) | 53 | 327 | 14 | 25 | 621 | 86 | 17 | 142 | 55 | 47 | 57 | 28 | |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 24 | 0 | 0 | 19 | 0 | |
| Lane Group Flow (vph) | 0 | 392 | 0 | 0 | 726 | 0 | 0 | 190 | 0 | 0 | 113 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | | |
| Actuated Green, G (s) | | 27.2 | | | 27.2 | | | 12.1 | | | 12.1 | | |
| Effective Green, g (s) | | 27.2 | | | 27.2 | | | 12.1 | | | 12.1 | | |
| Actuated g/C Ratio | | 0.56 | | | 0.56 | | | 0.25 | | | 0.25 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | | |
| Lane Grp Cap (vph) | | 903 | | | 1013 | | | 437 | | | 391 | | |
| v/s Ratio Prot | | | | | | | | | | | | | |
| v/s Ratio Perm | | 0.24 | | | c0.40 | | | c0.11 | | | 0.07 | | |
| v/c Ratio | | 0.43 | | | 0.72 | | | 0.43 | | | 0.29 | | |
| Uniform Delay, d1 | | 6.1 | | | 7.7 | | | 15.2 | | | 14.6 | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Incremental Delay, d2 | | 0.3 | | | 2.4 | | | 0.7 | | | 0.4 | | |
| Delay (s) | | 6.4 | | | 10.2 | | | 15.9 | | | 15.0 | | |
| Level of Service | | A | | | B | | | B | | | B | | |
| Approach Delay (s) | | 6.4 | | | 10.2 | | | 15.9 | | | 15.0 | | |
| Approach LOS | | A | | | B | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 10.4 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.63 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 48.3 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 64.6% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

MOVEMENT SUMMARY

Site: Baseline+Proj AM

#10 Marina Boulevard & Aurora Road Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|--|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph | |
| South: Aurora Road | | | | | | | | | | | | |
| 3 | L | 17 | 2.0 | 0.236 | 6.3 | LOS A | 1.1 | 27.7 | 0.55 | 0.90 | 27.1 | |
| 8 | T | 142 | 2.0 | 0.236 | 6.3 | LOS A | 1.1 | 27.7 | 0.55 | 0.67 | 29.8 | |
| 18 | R | 55 | 2.0 | 0.236 | 6.3 | LOS A | 1.1 | 27.7 | 0.55 | 0.72 | 29.5 | |
| Approach | | 215 | 2.0 | 0.236 | 6.3 | LOS A | 1.1 | 27.7 | 0.55 | 0.70 | 29.5 | |
| East: Marina Boulevard | | | | | | | | | | | | |
| 1 | L | 25 | 2.0 | 0.644 | 11.9 | LOS B | 5.8 | 146.7 | 0.68 | 0.84 | 24.8 | |
| 6 | T | 621 | 2.0 | 0.644 | 11.9 | LOS B | 5.8 | 146.7 | 0.68 | 0.66 | 26.7 | |
| 16 | R | 86 | 2.0 | 0.644 | 11.9 | LOS B | 5.8 | 146.7 | 0.68 | 0.70 | 26.4 | |
| Approach | | 732 | 2.0 | 0.644 | 11.9 | LOS B | 5.8 | 146.7 | 0.68 | 0.67 | 26.6 | |
| North: Aurora Road | | | | | | | | | | | | |
| 7 | L | 47 | 2.0 | 0.183 | 7.1 | LOS A | 0.8 | 19.4 | 0.62 | 0.94 | 26.7 | |
| 4 | T | 57 | 2.0 | 0.183 | 7.1 | LOS A | 0.8 | 19.4 | 0.62 | 0.76 | 29.1 | |
| 14 | R | 28 | 2.0 | 0.183 | 7.1 | LOS A | 0.8 | 19.4 | 0.62 | 0.80 | 28.8 | |
| Approach | | 132 | 2.0 | 0.183 | 7.1 | LOS A | 0.8 | 19.4 | 0.62 | 0.83 | 28.1 | |
| West: Marina Boulevard | | | | | | | | | | | | |
| 5 | L | 53 | 2.0 | 0.319 | 5.9 | LOS A | 1.8 | 46.0 | 0.35 | 0.82 | 27.2 | |
| 2 | T | 327 | 2.0 | 0.319 | 5.9 | LOS A | 1.8 | 46.0 | 0.35 | 0.48 | 30.2 | |
| 12 | R | 14 | 2.0 | 0.319 | 5.9 | LOS A | 1.8 | 46.0 | 0.35 | 0.55 | 29.7 | |
| Approach | | 395 | 2.0 | 0.319 | 5.9 | LOS A | 1.8 | 46.0 | 0.35 | 0.53 | 29.7 | |
| All Vehicles | | 1473 | 2.0 | 0.644 | 9.0 | LOS A | 5.8 | 146.7 | 0.57 | 0.65 | 27.9 | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

Baseline + Project AM Mitigated

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|-------|------|-------|------|-------|-------|------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 131 | 305 | 72 | 138 | 530 | 322 | 15 | 610 | 248 | 178 | 230 | 121 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 3198 | | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 2909 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 3198 | | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 2909 | |
| 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) | 142 | 332 | 78 | 150 | 576 | 350 | 16 | 663 | 270 | 193 | 250 | 132 |
| RTOR Reduction (vph) | 0 | 18 | 0 | 0 | 0 | 181 | 0 | 0 | 141 | 0 | 60 | 0 |
| Lane Group Flow (vph) | 142 | 392 | 0 | 150 | 576 | 169 | 16 | 663 | 129 | 193 | 322 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 10.5 | 32.2 | | 15.4 | 37.1 | 37.1 | 1.6 | 29.4 | 29.4 | 14.5 | 42.3 | |
| Effective Green, g (s) | 10.5 | 32.2 | | 15.4 | 37.1 | 37.1 | 1.6 | 29.4 | 29.4 | 14.5 | 42.3 | |
| Actuated g/C Ratio | 0.10 | 0.29 | | 0.14 | 0.34 | 0.34 | 0.01 | 0.27 | 0.27 | 0.13 | 0.39 | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 158 | 940 | | 227 | 589 | 472 | 24 | 869 | 357 | 214 | 1123 | |
| v/s Ratio Prot | c0.09 | 0.12 | | 0.09 | c0.33 | | 0.01 | c0.20 | | c0.12 | 0.11 | |
| v/s Ratio Perm | | | | | | 0.12 | | | 0.10 | | | |
| v/c Ratio | 0.90 | 0.42 | | 0.66 | 0.98 | 0.36 | 0.67 | 0.76 | 0.36 | 0.90 | 0.29 | |
| Uniform Delay, d1 | 49.0 | 31.1 | | 44.6 | 35.8 | 27.3 | 53.7 | 36.8 | 32.4 | 46.8 | 23.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 43.7 | 0.4 | | 7.7 | 31.3 | 0.6 | 57.0 | 4.3 | 0.9 | 36.4 | 0.2 | |
| Delay (s) | 92.6 | 31.5 | | 52.3 | 67.1 | 27.9 | 110.7 | 41.1 | 33.3 | 83.2 | 23.4 | |
| Level of Service | F | C | | D | E | C | F | D | C | F | C | |
| Approach Delay (s) | | 47.2 | | | 52.3 | | | 40.1 | | | 43.5 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 46.1 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.89 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 109.5 | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 77.3% | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

MOVEMENT SUMMARY

Site: Baseline + Proj AM

#19 Monarch Bay Drive & Mulford Point Drive Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Monarch Bay Drive | | | | | | | | | | | |
| 3 | L | 142 | 2.0 | 0.175 | 4.4 | LOS A | 0.9 | 21.7 | 0.29 | 0.73 | 27.7 |
| 8 | T | 76 | 2.0 | 0.175 | 4.4 | LOS A | 0.9 | 21.7 | 0.29 | 0.43 | 31.0 |
| Approach | | 218 | 2.0 | 0.175 | 4.4 | LOS A | 0.9 | 21.7 | 0.29 | 0.62 | 28.7 |
| North: Monarch Bay Drive | | | | | | | | | | | |
| 4 | T | 124 | 2.0 | 0.543 | 9.1 | LOS A | 4.1 | 105.2 | 0.50 | 0.52 | 28.0 |
| 14 | R | 539 | 2.0 | 0.543 | 9.1 | LOS A | 4.1 | 105.2 | 0.50 | 0.57 | 27.7 |
| Approach | | 663 | 2.0 | 0.543 | 9.1 | LOS A | 4.1 | 105.2 | 0.50 | 0.56 | 27.8 |
| West: Mulford Point Drive | | | | | | | | | | | |
| 5 | L | 123 | 2.0 | 0.142 | 4.1 | LOS A | 0.7 | 16.9 | 0.28 | 0.69 | 27.8 |
| 12 | R | 53 | 2.0 | 0.142 | 4.1 | LOS A | 0.7 | 16.9 | 0.28 | 0.48 | 30.6 |
| Approach | | 176 | 2.0 | 0.142 | 4.1 | LOS A | 0.7 | 16.9 | 0.28 | 0.63 | 28.6 |
| All Vehicles | | 1058 | 2.0 | 0.543 | 7.3 | LOS A | 4.1 | 105.2 | 0.42 | 0.59 | 28.1 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

















Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

Baseline + Project Mitigated
PM

HCM Signalized Intersection Capacity Analysis
10: Aurora Drive & Marina Boulevard

Baseline + Project PM Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|-----|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  | | |  | | |  | | |
| Volume (vph) | 46 | 612 | 19 | 45 | 444 | 48 | 18 | 43 | 29 | 26 | 40 | 35 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Frt | | 1.00 | | | 0.99 | | | 0.96 | | | 0.95 | | |
| Flt Protected | | 1.00 | | | 1.00 | | | 0.99 | | | 0.99 | | |
| Satd. Flow (prot) | | 1849 | | | 1833 | | | 1764 | | | 1753 | | |
| Flt Permitted | | 0.94 | | | 0.91 | | | 0.92 | | | 0.89 | | |
| Satd. Flow (perm) | | 1747 | | | 1681 | | | 1631 | | | 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) | 50 | 665 | 21 | 49 | 483 | 52 | 20 | 47 | 32 | 28 | 43 | 38 | |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 26 | 0 | 0 | 31 | 0 | |
| Lane Group Flow (vph) | 0 | 735 | 0 | 0 | 580 | 0 | 0 | 73 | 0 | 0 | 78 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | | |
| Actuated Green, G (s) | | 29.4 | | | 29.4 | | | 8.3 | | | 8.3 | | |
| Effective Green, g (s) | | 29.4 | | | 29.4 | | | 8.3 | | | 8.3 | | |
| Actuated g/C Ratio | | 0.63 | | | 0.63 | | | 0.18 | | | 0.18 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | | |
| Lane Grp Cap (vph) | | 1099 | | | 1058 | | | 289 | | | 281 | | |
| v/s Ratio Prot | | | | | | | | | | | | | |
| v/s Ratio Perm | | c0.42 | | | 0.35 | | | 0.04 | | | c0.05 | | |
| v/c Ratio | | 0.67 | | | 0.55 | | | 0.25 | | | 0.28 | | |
| Uniform Delay, d1 | | 5.5 | | | 4.9 | | | 16.5 | | | 16.6 | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Incremental Delay, d2 | | 1.6 | | | 0.6 | | | 0.5 | | | 0.5 | | |
| Delay (s) | | 7.1 | | | 5.5 | | | 17.0 | | | 17.1 | | |
| Level of Service | | A | | | A | | | B | | | B | | |
| Approach Delay (s) | | 7.1 | | | 5.5 | | | 17.0 | | | 17.1 | | |
| Approach LOS | | A | | | A | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 7.8 | | | | | | | | | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | | | 0.58 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 46.7 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 60.6% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

MOVEMENT SUMMARY

Site: Baseline+Proj PM

#10 Marina Boulevard & Aurora Road
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|--|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph | |
| South: Aurora Road | | | | | | | | | | | | |
| 3 | L | 20 | 2.0 | 0.148 | 7.1 | LOS A | 0.6 | 15.0 | 0.63 | 0.96 | 26.7 | |
| 8 | T | 47 | 2.0 | 0.148 | 7.1 | LOS A | 0.6 | 15.0 | 0.63 | 0.78 | 29.2 | |
| 18 | R | 32 | 2.0 | 0.148 | 7.1 | LOS A | 0.6 | 15.0 | 0.63 | 0.82 | 28.9 | |
| Approach | | 98 | 2.0 | 0.148 | 7.1 | LOS A | 0.6 | 15.0 | 0.63 | 0.83 | 28.5 | |
| East: Marina Boulevard | | | | | | | | | | | | |
| 1 | L | 49 | 2.0 | 0.466 | 7.7 | LOS A | 3.2 | 82.2 | 0.40 | 0.81 | 26.4 | |
| 6 | T | 483 | 2.0 | 0.466 | 7.7 | LOS A | 3.2 | 82.2 | 0.40 | 0.49 | 29.1 | |
| 16 | R | 52 | 2.0 | 0.466 | 7.7 | LOS A | 3.2 | 82.2 | 0.40 | 0.55 | 28.6 | |
| Approach | | 584 | 2.0 | 0.466 | 7.7 | LOS A | 3.2 | 82.2 | 0.40 | 0.52 | 28.8 | |
| North: Aurora Road | | | | | | | | | | | | |
| 7 | L | 28 | 2.0 | 0.136 | 5.9 | LOS A | 0.6 | 14.4 | 0.57 | 0.89 | 27.2 | |
| 4 | T | 43 | 2.0 | 0.136 | 5.9 | LOS A | 0.6 | 14.4 | 0.57 | 0.69 | 29.9 | |
| 14 | R | 38 | 2.0 | 0.136 | 5.9 | LOS A | 0.6 | 14.4 | 0.57 | 0.73 | 29.6 | |
| Approach | | 110 | 2.0 | 0.136 | 5.9 | LOS A | 0.6 | 14.4 | 0.57 | 0.75 | 29.0 | |
| West: Marina Boulevard | | | | | | | | | | | | |
| 5 | L | 50 | 2.0 | 0.590 | 9.9 | LOS A | 5.0 | 126.5 | 0.50 | 0.79 | 25.5 | |
| 2 | T | 665 | 2.0 | 0.590 | 9.9 | LOS A | 5.0 | 126.5 | 0.50 | 0.51 | 27.8 | |
| 12 | R | 21 | 2.0 | 0.590 | 9.9 | LOS A | 5.0 | 126.5 | 0.50 | 0.57 | 27.4 | |
| Approach | | 736 | 2.0 | 0.590 | 9.9 | LOS A | 5.0 | 126.5 | 0.50 | 0.53 | 27.6 | |
| All Vehicles | | 1527 | 2.0 | 0.590 | 8.6 | LOS A | 5.0 | 126.5 | 0.48 | 0.56 | 28.2 | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).



























Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

Baseline + Project PM Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|--|---|---|---|---|---|--|---|---|--|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |   | |  |  |  |  |   |  |  |   |  | |
| Volume (vph) | 228 | 432 | 36 | 222 | 362 | 182 | 24 | 279 | 172 | 283 | 702 | 199 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 3261 | | 1620 | 1739 | 1400 | 1652 | 3240 | 1351 | 1620 | 2969 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 3261 | | 1620 | 1739 | 1400 | 1652 | 3240 | 1351 | 1620 | 2969 | | |
| 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) | 248 | 470 | 39 | 241 | 393 | 198 | 26 | 303 | 187 | 308 | 763 | 216 | |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 149 | 0 | 0 | 146 | 0 | 24 | 0 | |
| Lane Group Flow (vph) | 248 | 504 | 0 | 241 | 393 | 49 | 26 | 303 | 41 | 308 | 955 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 12 | | | | | | 6 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 17.6 | 27.5 | | 15.8 | 25.7 | 25.7 | 2.4 | 22.8 | 22.8 | 19.9 | 40.3 | | |
| Effective Green, g (s) | 17.6 | 27.5 | | 15.8 | 25.7 | 25.7 | 2.4 | 22.8 | 22.8 | 19.9 | 40.3 | | |
| Actuated g/C Ratio | 0.17 | 0.26 | | 0.15 | 0.25 | 0.25 | 0.02 | 0.22 | 0.22 | 0.19 | 0.39 | | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 279 | 862 | | 246 | 429 | 345 | 38 | 710 | 296 | 309 | 1150 | | |
| v/s Ratio Prot | c0.15 | 0.15 | | 0.15 | c0.23 | | 0.02 | 0.09 | | c0.19 | c0.32 | | |
| v/s Ratio Perm | | | | | | 0.03 | | | 0.03 | | | | |
| v/c Ratio | 0.89 | 0.58 | | 0.98 | 0.92 | 0.14 | 0.68 | 0.43 | 0.14 | 1.00 | 0.83 | | |
| Uniform Delay, d1 | 42.2 | 33.3 | | 43.9 | 38.1 | 30.5 | 50.4 | 35.0 | 32.7 | 42.0 | 28.8 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 27.7 | 1.2 | | 51.2 | 24.3 | 0.3 | 43.4 | 0.6 | 0.3 | 50.0 | 5.5 | | |
| Delay (s) | 69.9 | 34.5 | | 95.1 | 62.4 | 30.8 | 93.8 | 35.5 | 33.0 | 92.1 | 34.2 | | |
| Level of Service | E | C | | F | E | C | F | D | C | F | C | | |
| Approach Delay (s) | | 46.1 | | | 64.4 | | | 37.5 | | | 48.1 | | |
| Approach LOS | | D | | | E | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 50.0 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.93 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 104.0 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 75.9% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: San Leandro Blvd & Marina Blvd

Baseline + Project PM Mitigated



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|-------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 331 | 481 | 342 | 3 | 196 | 14 | 228 | 439 | 14 | 51 | 670 | 255 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1647 | 1739 | 1770 | | 1737 | 1481 | 1652 | 3523 | | 1652 | 3149 | |
| Flt Permitted | 0.34 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 595 | 1739 | 1770 | | 1726 | 1481 | 1652 | 3523 | | 1652 | 3149 | |
| 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) | 360 | 523 | 372 | 3 | 213 | 15 | 248 | 477 | 15 | 55 | 728 | 277 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 2 | 0 | 0 | 39 | 0 |
| Lane Group Flow (vph) | 360 | 523 | 372 | 0 | 216 | 3 | 248 | 490 | 0 | 55 | 966 | 0 |
| Confl. Peds. (#/hr) | 12 | | | | | | 12 | | | | | 6 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 34.7 | 34.7 | 100.0 | | 20.2 | 20.2 | 17.9 | 43.9 | | 6.9 | 32.4 | |
| Effective Green, g (s) | 34.7 | 34.7 | 100.0 | | 20.2 | 20.2 | 17.9 | 43.9 | | 6.9 | 32.4 | |
| Actuated g/C Ratio | 0.35 | 0.35 | 1.00 | | 0.20 | 0.20 | 0.18 | 0.44 | | 0.07 | 0.32 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 316 | 603 | 1770 | | 348 | 299 | 295 | 1546 | | 113 | 1020 | |
| v/s Ratio Prot | c0.12 | 0.30 | | | | | c0.15 | 0.14 | | 0.03 | c0.31 | |
| v/s Ratio Perm | c0.28 | | 0.21 | | 0.13 | 0.00 | | | | | | |
| v/c Ratio | 1.14 | 0.87 | 0.21 | | 0.62 | 0.01 | 0.84 | 0.32 | | 0.49 | 0.95 | |
| Uniform Delay, d1 | 30.8 | 30.5 | 0.0 | | 36.4 | 31.9 | 39.7 | 18.3 | | 44.8 | 33.0 | |
| Progression Factor | 0.83 | 0.83 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 89.7 | 11.0 | 0.2 | | 3.9 | 0.0 | 18.9 | 0.5 | | 3.3 | 18.1 | |
| Delay (s) | 115.3 | 36.3 | 0.2 | | 40.3 | 31.9 | 58.6 | 18.8 | | 48.1 | 51.0 | |
| Level of Service | F | D | A | | D | C | E | B | | D | D | |
| Approach Delay (s) | | 48.3 | | | 39.7 | | | 32.2 | | | 50.9 | |
| Approach LOS | | D | | | D | | | C | | | D | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 44.9 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 1.03 | D |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 94.7% | 19.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | F |

c Critical Lane Group

MOVEMENT SUMMARY

Site: Baseline + Proj PM

#19 Monarch Bay Drive & Mulford Point Drive Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Monarch Bay Drive | | | | | | | | | | | |
| 3 | L | 103 | 2.0 | 0.249 | 7.1 | LOS A | 1.1 | 28.5 | 0.60 | 0.91 | 26.6 |
| 8 | T | 101 | 2.0 | 0.249 | 7.1 | LOS A | 1.1 | 28.5 | 0.60 | 0.73 | 29.1 |
| Approach | | 204 | 2.0 | 0.249 | 7.1 | LOS A | 1.1 | 28.5 | 0.60 | 0.82 | 27.7 |
| North: Monarch Bay Drive | | | | | | | | | | | |
| 4 | T | 185 | 2.0 | 0.331 | 5.9 | LOS A | 1.9 | 49.2 | 0.32 | 0.45 | 30.2 |
| 14 | R | 236 | 2.0 | 0.331 | 5.9 | LOS A | 1.9 | 49.2 | 0.32 | 0.53 | 29.7 |
| Approach | | 421 | 2.0 | 0.331 | 5.9 | LOS A | 1.9 | 49.2 | 0.32 | 0.49 | 29.9 |
| West: Mulford Point Drive | | | | | | | | | | | |
| 5 | L | 532 | 2.0 | 0.567 | 9.9 | LOS A | 4.3 | 109.1 | 0.57 | 0.72 | 25.1 |
| 12 | R | 132 | 2.0 | 0.567 | 9.9 | LOS A | 4.3 | 109.1 | 0.57 | 0.60 | 26.9 |
| Approach | | 663 | 2.0 | 0.567 | 9.9 | LOS A | 4.3 | 109.1 | 0.57 | 0.70 | 25.4 |
| All Vehicles | | 1288 | 2.0 | 0.567 | 8.1 | LOS A | 4.3 | 109.1 | 0.50 | 0.65 | 27.0 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

Baseline + Project Mitigated
Saturday

HCM Signalized Intersection Capacity Analysis
10: Aurora Drive & Marina Boulevard

Baseline+Project Saturday Mitigated

8/21/2014



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|-------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Volume (vph) | 24 | 385 | 14 | 21 | 587 | 17 | 19 | 18 | 37 | 13 | 18 | 24 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | | 1.00 | | | 1.00 | | | 0.93 | | | 0.94 | |
| Flt Protected | | 1.00 | | | 1.00 | | | 0.99 | | | 0.99 | |
| Satd. Flow (prot) | | 1849 | | | 1853 | | | 1716 | | | 1734 | |
| Flt Permitted | | 0.95 | | | 0.98 | | | 0.90 | | | 0.91 | |
| Satd. Flow (perm) | | 1762 | | | 1817 | | | 1563 | | | 1592 | |
| 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) | 26 | 418 | 15 | 23 | 638 | 18 | 21 | 20 | 40 | 14 | 20 | 26 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 32 | 0 | 0 | 21 | 0 |
| Lane Group Flow (vph) | 0 | 457 | 0 | 0 | 677 | 0 | 0 | 49 | 0 | 0 | 39 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 17.3 | | | 17.3 | | | 6.7 | | | 6.7 | |
| Effective Green, g (s) | | 17.3 | | | 17.3 | | | 6.7 | | | 6.7 | |
| Actuated g/C Ratio | | 0.52 | | | 0.52 | | | 0.20 | | | 0.20 | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 923 | | | 952 | | | 317 | | | 323 | |
| v/s Ratio Prot | | | | | | | | | | | | |
| v/s Ratio Perm | | 0.26 | | | c0.37 | | | c0.03 | | | 0.02 | |
| v/c Ratio | | 0.49 | | | 0.71 | | | 0.15 | | | 0.12 | |
| Uniform Delay, d1 | | 5.0 | | | 6.0 | | | 10.8 | | | 10.7 | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 0.4 | | | 2.5 | | | 0.2 | | | 0.2 | |
| Delay (s) | | 5.5 | | | 8.5 | | | 11.0 | | | 10.9 | |
| Level of Service | | A | | | A | | | B | | | B | |
| Approach Delay (s) | | 5.5 | | | 8.5 | | | 11.0 | | | 10.9 | |
| Approach LOS | | A | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 7.7 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.56 | | |
| Actuated Cycle Length (s) | 33.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 51.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

MOVEMENT SUMMARY

Site: Baseline+Proj SAT

#10 Marina Boulevard & Aurora Road Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Aurora Road | | | | | | | | | | | |
| 3 | L | 21 | 2.0 | 0.091 | 4.9 | LOS A | 0.4 | 9.6 | 0.51 | 0.84 | 27.6 |
| 8 | T | 20 | 2.0 | 0.091 | 4.9 | LOS A | 0.4 | 9.6 | 0.51 | 0.61 | 30.5 |
| 18 | R | 40 | 2.0 | 0.091 | 4.9 | LOS A | 0.4 | 9.6 | 0.51 | 0.66 | 30.2 |
| Approach | | 80 | 2.0 | 0.091 | 4.9 | LOS A | 0.4 | 9.6 | 0.51 | 0.69 | 29.5 |
| East: Marina Boulevard | | | | | | | | | | | |
| 1 | L | 23 | 2.0 | 0.515 | 8.2 | LOS A | 4.1 | 103.2 | 0.33 | 0.82 | 26.1 |
| 6 | T | 638 | 2.0 | 0.515 | 8.2 | LOS A | 4.1 | 103.2 | 0.33 | 0.44 | 28.8 |
| 16 | R | 18 | 2.0 | 0.515 | 8.2 | LOS A | 4.1 | 103.2 | 0.33 | 0.52 | 28.4 |
| Approach | | 679 | 2.0 | 0.515 | 8.2 | LOS A | 4.1 | 103.2 | 0.33 | 0.46 | 28.7 |
| North: Aurora Road | | | | | | | | | | | |
| 7 | L | 14 | 2.0 | 0.085 | 6.0 | LOS A | 0.3 | 8.5 | 0.59 | 0.90 | 27.2 |
| 4 | T | 20 | 2.0 | 0.085 | 6.0 | LOS A | 0.3 | 8.5 | 0.59 | 0.71 | 29.8 |
| 14 | R | 26 | 2.0 | 0.085 | 6.0 | LOS A | 0.3 | 8.5 | 0.59 | 0.75 | 29.5 |
| Approach | | 60 | 2.0 | 0.085 | 6.0 | LOS A | 0.3 | 8.5 | 0.59 | 0.77 | 29.0 |
| West: Marina Boulevard | | | | | | | | | | | |
| 5 | L | 26 | 2.0 | 0.345 | 5.8 | LOS A | 2.1 | 53.7 | 0.23 | 0.85 | 27.1 |
| 2 | T | 418 | 2.0 | 0.345 | 5.8 | LOS A | 2.1 | 53.7 | 0.23 | 0.43 | 30.3 |
| 12 | R | 15 | 2.0 | 0.345 | 5.8 | LOS A | 2.1 | 53.7 | 0.23 | 0.51 | 29.7 |
| Approach | | 460 | 2.0 | 0.345 | 5.8 | LOS A | 2.1 | 53.7 | 0.23 | 0.45 | 30.1 |
| All Vehicles | | 1279 | 2.0 | 0.515 | 7.0 | LOS A | 4.1 | 103.2 | 0.32 | 0.49 | 29.2 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

Baseline+Project Saturday Mitigated

8/21/2014



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations | ↘ | ↗ | | ↘ | ↗ | ↗ | ↘ | ↗ | ↗ | ↘ | ↗ | ↗ |
| Volume (vph) | 169 | 302 | 52 | 192 | 444 | 136 | 50 | 203 | 173 | 146 | 252 | 228 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 3220 | | 1620 | 1739 | 1413 | 1652 | 3240 | 1351 | 1620 | 2851 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 3220 | | 1620 | 1739 | 1413 | 1652 | 3240 | 1351 | 1620 | 2851 | |
| 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) | 184 | 328 | 57 | 209 | 483 | 148 | 54 | 221 | 188 | 159 | 274 | 248 |
| RTOR Reduction (vph) | 0 | 9 | 0 | 0 | 0 | 85 | 0 | 0 | 156 | 0 | 133 | 0 |
| Lane Group Flow (vph) | 184 | 376 | 0 | 209 | 483 | 63 | 54 | 221 | 32 | 159 | 389 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 7 | | | | | | 3 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 16.8 | 25.0 | | 18.1 | 26.3 | 26.3 | 8.1 | 15.7 | 15.7 | 15.9 | 23.5 | |
| Effective Green, g (s) | 16.8 | 25.0 | | 18.1 | 26.3 | 26.3 | 8.1 | 15.7 | 15.7 | 15.9 | 23.5 | |
| Actuated g/C Ratio | 0.18 | 0.27 | | 0.20 | 0.28 | 0.28 | 0.09 | 0.17 | 0.17 | 0.17 | 0.25 | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 299 | 868 | | 316 | 493 | 400 | 144 | 548 | 228 | 277 | 722 | |
| v/s Ratio Prot | 0.11 | 0.12 | | c0.13 | c0.28 | | 0.03 | 0.07 | | c0.10 | c0.14 | |
| v/s Ratio Perm | | | | | | 0.04 | | | 0.02 | | | |
| v/c Ratio | 0.62 | 0.43 | | 0.66 | 0.98 | 0.16 | 0.38 | 0.40 | 0.14 | 0.57 | 0.54 | |
| Uniform Delay, d1 | 35.0 | 28.0 | | 34.5 | 32.9 | 24.9 | 39.9 | 34.3 | 32.8 | 35.3 | 29.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.3 | 0.5 | | 5.6 | 35.0 | 0.3 | 2.2 | 0.7 | 0.4 | 3.4 | 1.0 | |
| Delay (s) | 39.2 | 28.5 | | 40.1 | 67.9 | 25.1 | 42.1 | 35.0 | 33.1 | 38.7 | 30.9 | |
| Level of Service | D | C | | D | E | C | D | C | C | D | C | |
| Approach Delay (s) | | 31.9 | | | 53.4 | | | 35.1 | | | 32.7 | |
| Approach LOS | | C | | | D | | | D | | | C | |

Intersection Summary

















| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 39.8 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.76 | | |
| Actuated Cycle Length (s) | 92.7 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 66.6% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

2020 + Project Mitigated AM

HCM Signalized Intersection Capacity Analysis
10: Aurora Drive & Marina Boulevard

2020 AM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|-----|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  | | |  | | |  | | |
| Volume (vph) | 46 | 313 | 12 | 27 | 561 | 81 | 15 | 131 | 53 | 45 | 51 | 25 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Frt | | 1.00 | | | 0.98 | | | 0.96 | | | 0.97 | | |
| Flt Protected | | 0.99 | | | 1.00 | | | 1.00 | | | 0.98 | | |
| Satd. Flow (prot) | | 1843 | | | 1829 | | | 1789 | | | 1778 | | |
| Flt Permitted | | 0.88 | | | 0.98 | | | 0.97 | | | 0.86 | | |
| Satd. Flow (perm) | | 1624 | | | 1790 | | | 1747 | | | 1554 | | |
| 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) | 50 | 340 | 13 | 29 | 610 | 88 | 16 | 142 | 58 | 49 | 55 | 27 | |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 25 | 0 | 0 | 18 | 0 | |
| Lane Group Flow (vph) | 0 | 402 | 0 | 0 | 721 | 0 | 0 | 191 | 0 | 0 | 113 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | | |
| Actuated Green, G (s) | | 24.3 | | | 24.3 | | | 11.9 | | | 11.9 | | |
| Effective Green, g (s) | | 24.3 | | | 24.3 | | | 11.9 | | | 11.9 | | |
| Actuated g/C Ratio | | 0.54 | | | 0.54 | | | 0.26 | | | 0.26 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | | |
| Lane Grp Cap (vph) | | 873 | | | 962 | | | 459 | | | 409 | | |
| v/s Ratio Prot | | | | | | | | | | | | | |
| v/s Ratio Perm | | 0.25 | | | c0.40 | | | c0.11 | | | 0.07 | | |
| v/c Ratio | | 0.46 | | | 0.75 | | | 0.42 | | | 0.28 | | |
| Uniform Delay, d1 | | 6.4 | | | 8.1 | | | 13.8 | | | 13.2 | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Incremental Delay, d2 | | 0.4 | | | 3.2 | | | 0.6 | | | 0.4 | | |
| Delay (s) | | 6.8 | | | 11.3 | | | 14.4 | | | 13.6 | | |
| Level of Service | | A | | | B | | | B | | | B | | |
| Approach Delay (s) | | 6.8 | | | 11.3 | | | 14.4 | | | 13.6 | | |
| Approach LOS | | A | | | B | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 10.7 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.64 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 45.2 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 66.6% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

MOVEMENT SUMMARY

Site: 2020+Proj AM

#10 Marina Boulevard & Aurora Road Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Aurora Road | | | | | | | | | | | |
| 3 | L | 16 | 2.0 | 0.240 | 6.4 | LOS A | 1.1 | 28.1 | 0.56 | 0.91 | 27.1 |
| 8 | T | 142 | 2.0 | 0.240 | 6.4 | LOS A | 1.1 | 28.1 | 0.56 | 0.68 | 29.8 |
| 18 | R | 58 | 2.0 | 0.240 | 6.4 | LOS A | 1.1 | 28.1 | 0.56 | 0.73 | 29.4 |
| Approach | | 216 | 2.0 | 0.240 | 6.4 | LOS A | 1.1 | 28.1 | 0.56 | 0.71 | 29.4 |
| East: Marina Boulevard | | | | | | | | | | | |
| 1 | L | 29 | 2.0 | 0.637 | 11.7 | LOS B | 5.6 | 141.9 | 0.67 | 0.83 | 24.9 |
| 6 | T | 610 | 2.0 | 0.637 | 11.7 | LOS B | 5.6 | 141.9 | 0.67 | 0.65 | 26.8 |
| 16 | R | 88 | 2.0 | 0.637 | 11.7 | LOS B | 5.6 | 141.9 | 0.67 | 0.69 | 26.5 |
| Approach | | 727 | 2.0 | 0.637 | 11.7 | LOS B | 5.6 | 141.9 | 0.67 | 0.66 | 26.6 |
| North: Aurora Road | | | | | | | | | | | |
| 7 | L | 49 | 2.0 | 0.182 | 7.0 | LOS A | 0.8 | 19.2 | 0.62 | 0.94 | 26.7 |
| 4 | T | 55 | 2.0 | 0.182 | 7.0 | LOS A | 0.8 | 19.2 | 0.62 | 0.76 | 29.1 |
| 14 | R | 27 | 2.0 | 0.182 | 7.0 | LOS A | 0.8 | 19.2 | 0.62 | 0.80 | 28.8 |
| Approach | | 132 | 2.0 | 0.182 | 7.0 | LOS A | 0.8 | 19.2 | 0.62 | 0.83 | 28.1 |
| West: Marina Boulevard | | | | | | | | | | | |
| 5 | L | 50 | 2.0 | 0.327 | 6.0 | LOS A | 1.9 | 47.6 | 0.36 | 0.82 | 27.2 |
| 2 | T | 340 | 2.0 | 0.327 | 6.0 | LOS A | 1.9 | 47.6 | 0.36 | 0.48 | 30.1 |
| 12 | R | 13 | 2.0 | 0.327 | 6.0 | LOS A | 1.9 | 47.6 | 0.36 | 0.55 | 29.7 |
| Approach | | 403 | 2.0 | 0.327 | 6.0 | LOS A | 1.9 | 47.6 | 0.36 | 0.53 | 29.7 |
| All Vehicles | | 1478 | 2.0 | 0.637 | 9.0 | LOS A | 5.6 | 141.9 | 0.56 | 0.65 | 27.9 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).


























Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

2020 AM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|--|---|---|---|---|--|--|---|---|--|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |   | |  |  |  |  |   |  |  |   | | |
| Volume (vph) | 144 | 306 | 72 | 157 | 541 | 382 | 13 | 764 | 248 | 202 | 280 | 109 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 3199 | | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 2941 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 3199 | | 1620 | 1739 | 1396 | 1652 | 3240 | 1332 | 1620 | 2941 | | |
| 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) | 157 | 333 | 78 | 171 | 588 | 415 | 14 | 830 | 270 | 220 | 304 | 118 | |
| RTOR Reduction (vph) | 0 | 18 | 0 | 0 | 0 | 168 | 0 | 0 | 139 | 0 | 35 | 0 | |
| Lane Group Flow (vph) | 157 | 393 | 0 | 171 | 588 | 247 | 14 | 830 | 131 | 220 | 387 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 10.2 | 31.5 | | 17.1 | 38.4 | 38.4 | 1.6 | 31.2 | 31.2 | 14.5 | 44.1 | | |
| Effective Green, g (s) | 10.2 | 31.5 | | 17.1 | 38.4 | 38.4 | 1.6 | 31.2 | 31.2 | 14.5 | 44.1 | | |
| Actuated g/C Ratio | 0.09 | 0.28 | | 0.15 | 0.34 | 0.34 | 0.01 | 0.28 | 0.28 | 0.13 | 0.39 | | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 150 | 897 | | 246 | 594 | 477 | 23 | 900 | 370 | 209 | 1154 | | |
| v/s Ratio Prot | c0.10 | 0.12 | | 0.11 | c0.34 | | 0.01 | c0.26 | | c0.14 | 0.13 | | |
| v/s Ratio Perm | | | | | | 0.18 | | | 0.10 | | | | |
| v/c Ratio | 1.05 | 0.44 | | 0.70 | 0.99 | 0.52 | 0.61 | 0.92 | 0.35 | 1.05 | 0.34 | | |
| Uniform Delay, d1 | 51.0 | 33.1 | | 45.1 | 36.8 | 29.5 | 55.0 | 39.4 | 32.5 | 48.9 | 23.8 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 86.4 | 0.5 | | 8.9 | 34.0 | 1.3 | 43.0 | 14.8 | 0.8 | 76.8 | 0.2 | | |
| Delay (s) | 137.5 | 33.6 | | 54.0 | 70.8 | 30.8 | 98.1 | 54.2 | 33.3 | 125.7 | 24.1 | | |
| Level of Service | F | C | | D | E | C | F | D | C | F | C | | |
| Approach Delay (s) | | 62.3 | | | 54.2 | | | 49.7 | | | 58.9 | | |
| Approach LOS | | E | | | D | | | D | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 54.9 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.98 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 112.3 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 83.9% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020 AM + Project Mitigated



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|-------|------|------|------|------|------|------|---------------------------|-----|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1037 | 547 | 396 | 1454 | 0 | 0 | 0 | 458 | 0 | 0 | 1074 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1127 | 595 | 430 | 1580 | 0 | 0 | 0 | 498 | 0 | 0 | 1167 | |
| RTOR Reduction (vph) | 0 | 0 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | |
| Lane Group Flow (vph) | 0 | 1127 | 325 | 430 | 1580 | 0 | 0 | 0 | 498 | 0 | 0 | 1153 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 4 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 36.9 | 36.9 | 33.5 | 39.4 | | | | 33.5 | | | 33.5 | |
| Effective Green, g (s) | | 36.9 | 36.9 | 33.5 | 39.4 | | | | 33.5 | | | 33.5 | |
| Actuated g/C Ratio | | 0.46 | 0.46 | 0.42 | 0.50 | | | | 0.42 | | | 0.42 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1559 | 1227 | 1326 | 1664 | | | | 1229 | | | 1175 | |
| v/s Ratio Prot | | 0.34 | | 0.14 | c0.47 | | | | 0.17 | | | c0.41 | |
| v/s Ratio Perm | | | 0.12 | | | | | | | | | | |
| v/c Ratio | | 0.72 | 0.26 | 0.32 | 0.95 | | | | 0.41 | | | 0.98 | |
| Uniform Delay, d1 | | 17.1 | 13.0 | 15.4 | 19.1 | | | | 16.0 | | | 22.6 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 1.7 | 0.1 | 0.1 | 12.0 | | | | 0.2 | | | 21.6 | |
| Delay (s) | | 18.8 | 13.1 | 15.5 | 31.1 | | | | 16.2 | | | 44.3 | |
| Level of Service | | B | B | B | C | | | | B | | | D | |
| Approach Delay (s) | | 16.8 | | | 27.7 | | | 16.2 | | | 44.3 | | |
| Approach LOS | | B | | | C | | | B | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 26.8 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.99 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 79.4 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 84.8% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2020 AM + Project Mitigated

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|-------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 329 | 251 | 373 | 9 | 292 | 78 | 451 | 1047 | 8 | 47 | 487 | 183 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1736 | 1480 | 1652 | 3534 | | 1652 | 3152 | |
| Flt Permitted | 0.19 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 325 | 1739 | 1770 | | 1716 | 1480 | 1652 | 3534 | | 1652 | 3152 | |
| 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) | 358 | 273 | 405 | 10 | 317 | 85 | 490 | 1138 | 9 | 51 | 529 | 199 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 66 | 0 | 1 | 0 | 0 | 41 | 0 |
| Lane Group Flow (vph) | 358 | 273 | 405 | 0 | 327 | 19 | 490 | 1146 | 0 | 51 | 687 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 39.2 | 39.2 | 95.0 | | 20.7 | 20.7 | 21.8 | 34.2 | | 7.1 | 19.0 | |
| Effective Green, g (s) | 39.2 | 39.2 | 95.0 | | 20.7 | 20.7 | 21.8 | 34.2 | | 7.1 | 19.0 | |
| Actuated g/C Ratio | 0.41 | 0.41 | 1.00 | | 0.22 | 0.22 | 0.23 | 0.36 | | 0.07 | 0.20 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 336 | 717 | 1770 | | 373 | 322 | 379 | 1272 | | 123 | 630 | |
| v/s Ratio Prot | c0.16 | 0.16 | | | | | c0.30 | 0.32 | | 0.03 | c0.22 | |
| v/s Ratio Perm | c0.28 | | 0.23 | | 0.19 | 0.01 | | | | | | |
| v/c Ratio | 1.07 | 0.38 | 0.23 | | 0.88 | 0.06 | 1.29 | 0.90 | | 0.41 | 1.09 | |
| Uniform Delay, d1 | 23.3 | 19.4 | 0.0 | | 35.9 | 29.4 | 36.6 | 28.8 | | 42.0 | 38.0 | |
| Progression Factor | 0.93 | 0.83 | 1.00 | | 1.00 | 1.00 | 1.10 | 0.76 | | 0.88 | 0.89 | |
| Incremental Delay, d2 | 64.7 | 0.4 | 0.3 | | 20.5 | 0.1 | 149.8 | 10.2 | | 2.2 | 62.4 | |
| Delay (s) | 86.4 | 16.5 | 0.3 | | 56.4 | 29.5 | 190.0 | 32.1 | | 39.0 | 96.0 | |
| Level of Service | F | B | A | | E | C | F | C | | D | F | |
| Approach Delay (s) | | 34.3 | | | 50.9 | | | 79.4 | | | 92.3 | |
| Approach LOS | | C | | | D | | | E | | | F | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 66.8 | | | | | | | | | E |
| HCM 2000 Volume to Capacity ratio | | | 1.17 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 95.0 | | | | | | | | 19.0 | |
| Intersection Capacity Utilization | | | 96.3% | | | | | | | | | F |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

MOVEMENT SUMMARY

Site: 2020+Proj AM

#19 Monarch Bay Drive & Mulford Point Drive Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Monarch Bay Drive | | | | | | | | | | | |
| 3 | L | 153 | 2.0 | 0.184 | 4.5 | LOS A | 0.9 | 22.9 | 0.30 | 0.72 | 27.7 |
| 8 | T | 74 | 2.0 | 0.184 | 4.5 | LOS A | 0.9 | 22.9 | 0.30 | 0.43 | 30.9 |
| Approach | | 227 | 2.0 | 0.184 | 4.5 | LOS A | 0.9 | 22.9 | 0.30 | 0.63 | 28.6 |
| North: Monarch Bay Drive | | | | | | | | | | | |
| 4 | T | 123 | 2.0 | 0.539 | 9.1 | LOS A | 4.0 | 102.7 | 0.51 | 0.53 | 28.0 |
| 14 | R | 528 | 2.0 | 0.539 | 9.1 | LOS A | 4.0 | 102.7 | 0.51 | 0.58 | 27.7 |
| Approach | | 651 | 2.0 | 0.539 | 9.1 | LOS A | 4.0 | 102.7 | 0.51 | 0.57 | 27.8 |
| West: Mulford Point Drive | | | | | | | | | | | |
| 5 | L | 130 | 2.0 | 0.143 | 4.1 | LOS A | 0.7 | 17.1 | 0.28 | 0.69 | 27.8 |
| 12 | R | 48 | 2.0 | 0.143 | 4.1 | LOS A | 0.7 | 17.1 | 0.28 | 0.48 | 30.6 |
| Approach | | 178 | 2.0 | 0.143 | 4.1 | LOS A | 0.7 | 17.1 | 0.28 | 0.63 | 28.5 |
| All Vehicles | | 1057 | 2.0 | 0.539 | 7.3 | LOS A | 4.0 | 102.7 | 0.43 | 0.60 | 28.1 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

















Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

2020 + Project Mitigated PM

HCM Signalized Intersection Capacity Analysis
10: Aurora Drive & Marina Boulevard

2020 PM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|-----|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  | | |  | | |  | | |
| Volume (vph) | 44 | 599 | 18 | 44 | 439 | 50 | 17 | 43 | 33 | 29 | 40 | 34 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Frt | | 1.00 | | | 0.99 | | | 0.95 | | | 0.96 | | |
| Flt Protected | | 1.00 | | | 1.00 | | | 0.99 | | | 0.99 | | |
| Satd. Flow (prot) | | 1850 | | | 1832 | | | 1757 | | | 1755 | | |
| Flt Permitted | | 0.94 | | | 0.91 | | | 0.93 | | | 0.89 | | |
| Satd. Flow (perm) | | 1749 | | | 1683 | | | 1657 | | | 1585 | | |
| 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) | 48 | 651 | 20 | 48 | 477 | 54 | 18 | 47 | 36 | 32 | 43 | 37 | |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 28 | 0 | 0 | 29 | 0 | |
| Lane Group Flow (vph) | 0 | 718 | 0 | 0 | 575 | 0 | 0 | 73 | 0 | 0 | 83 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | | |
| Actuated Green, G (s) | | 24.9 | | | 24.9 | | | 10.0 | | | 10.0 | | |
| Effective Green, g (s) | | 24.9 | | | 24.9 | | | 10.0 | | | 10.0 | | |
| Actuated g/C Ratio | | 0.57 | | | 0.57 | | | 0.23 | | | 0.23 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | | |
| Lane Grp Cap (vph) | | 992 | | | 954 | | | 377 | | | 361 | | |
| v/s Ratio Prot | | | | | | | | | | | | | |
| v/s Ratio Perm | | c0.41 | | | 0.34 | | | 0.04 | | | c0.05 | | |
| v/c Ratio | | 0.72 | | | 0.60 | | | 0.19 | | | 0.23 | | |
| Uniform Delay, d1 | | 7.0 | | | 6.2 | | | 13.7 | | | 13.8 | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Incremental Delay, d2 | | 2.6 | | | 1.1 | | | 0.3 | | | 0.3 | | |
| Delay (s) | | 9.6 | | | 7.3 | | | 13.9 | | | 14.1 | | |
| Level of Service | | A | | | A | | | B | | | B | | |
| Approach Delay (s) | | 9.6 | | | 7.3 | | | 13.9 | | | 14.1 | | |
| Approach LOS | | A | | | A | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 9.4 | | | | | | | | | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | | | 0.58 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 43.9 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 60.3% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

MOVEMENT SUMMARY

Site: 2020+Proj PM

#10 Marina Boulevard & Aurora Road Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Aurora Road | | | | | | | | | | | |
| 3 | L | 18 | 2.0 | 0.151 | 7.1 | LOS A | 0.6 | 15.4 | 0.63 | 0.96 | 26.7 |
| 8 | T | 47 | 2.0 | 0.151 | 7.1 | LOS A | 0.6 | 15.4 | 0.63 | 0.78 | 29.2 |
| 18 | R | 36 | 2.0 | 0.151 | 7.1 | LOS A | 0.6 | 15.4 | 0.63 | 0.82 | 28.9 |
| Approach | | 101 | 2.0 | 0.151 | 7.1 | LOS A | 0.6 | 15.4 | 0.63 | 0.83 | 28.6 |
| East: Marina Boulevard | | | | | | | | | | | |
| 1 | L | 48 | 2.0 | 0.461 | 7.6 | LOS A | 3.2 | 80.9 | 0.40 | 0.81 | 26.4 |
| 6 | T | 477 | 2.0 | 0.461 | 7.6 | LOS A | 3.2 | 80.9 | 0.40 | 0.48 | 29.1 |
| 16 | R | 54 | 2.0 | 0.461 | 7.6 | LOS A | 3.2 | 80.9 | 0.40 | 0.55 | 28.7 |
| Approach | | 579 | 2.0 | 0.461 | 7.6 | LOS A | 3.2 | 80.9 | 0.40 | 0.52 | 28.8 |
| North: Aurora Road | | | | | | | | | | | |
| 7 | L | 32 | 2.0 | 0.138 | 5.8 | LOS A | 0.6 | 14.7 | 0.57 | 0.89 | 27.2 |
| 4 | T | 43 | 2.0 | 0.138 | 5.8 | LOS A | 0.6 | 14.7 | 0.57 | 0.68 | 29.9 |
| 14 | R | 37 | 2.0 | 0.138 | 5.8 | LOS A | 0.6 | 14.7 | 0.57 | 0.73 | 29.6 |
| Approach | | 112 | 2.0 | 0.138 | 5.8 | LOS A | 0.6 | 14.7 | 0.57 | 0.75 | 29.0 |
| West: Marina Boulevard | | | | | | | | | | | |
| 5 | L | 48 | 2.0 | 0.577 | 9.6 | LOS A | 4.8 | 120.8 | 0.50 | 0.79 | 25.6 |
| 2 | T | 651 | 2.0 | 0.577 | 9.6 | LOS A | 4.8 | 120.8 | 0.50 | 0.51 | 27.9 |
| 12 | R | 20 | 2.0 | 0.577 | 9.6 | LOS A | 4.8 | 120.8 | 0.50 | 0.57 | 27.6 |
| Approach | | 718 | 2.0 | 0.577 | 9.6 | LOS A | 4.8 | 120.8 | 0.50 | 0.53 | 27.7 |
| All Vehicles | | 1511 | 2.0 | 0.577 | 8.4 | LOS A | 4.8 | 120.8 | 0.47 | 0.56 | 28.3 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
























Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

2020 PM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  | |
| Volume (vph) | 196 | 464 | 37 | 223 | 375 | 205 | 27 | 345 | 187 | 279 | 695 | 180 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 3262 | | 1620 | 1739 | 1397 | 1652 | 3240 | 1332 | 1620 | 2977 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 3262 | | 1620 | 1739 | 1397 | 1652 | 3240 | 1332 | 1620 | 2977 | | |
| 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) | 213 | 504 | 40 | 242 | 408 | 223 | 29 | 375 | 203 | 303 | 755 | 196 | |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 165 | 0 | 0 | 157 | 0 | 21 | 0 | |
| Lane Group Flow (vph) | 213 | 539 | 0 | 242 | 408 | 58 | 29 | 375 | 46 | 303 | 930 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 15.3 | 26.3 | | 15.9 | 26.9 | 26.9 | 2.5 | 23.3 | 23.3 | 19.7 | 40.5 | | |
| Effective Green, g (s) | 15.3 | 26.3 | | 15.9 | 26.9 | 26.9 | 2.5 | 23.3 | 23.3 | 19.7 | 40.5 | | |
| Actuated g/C Ratio | 0.15 | 0.25 | | 0.15 | 0.26 | 0.26 | 0.02 | 0.23 | 0.23 | 0.19 | 0.39 | | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 244 | 831 | | 249 | 453 | 364 | 40 | 731 | 300 | 309 | 1168 | | |
| v/s Ratio Prot | 0.13 | 0.17 | | c0.15 | c0.23 | | 0.02 | 0.12 | | c0.19 | c0.31 | | |
| v/s Ratio Perm | | | | | | 0.04 | | | 0.03 | | | | |
| v/c Ratio | 0.87 | 0.65 | | 0.97 | 0.90 | 0.16 | 0.72 | 0.51 | 0.15 | 0.98 | 0.80 | | |
| Uniform Delay, d1 | 43.0 | 34.3 | | 43.4 | 36.9 | 29.4 | 50.0 | 35.0 | 32.0 | 41.6 | 27.7 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 27.9 | 2.0 | | 49.1 | 21.1 | 0.3 | 51.1 | 0.8 | 0.3 | 45.8 | 4.1 | | |
| Delay (s) | 70.9 | 36.3 | | 92.5 | 57.9 | 29.7 | 101.1 | 35.8 | 32.4 | 87.4 | 31.8 | | |
| Level of Service | E | D | | F | E | C | F | D | C | F | C | | |
| Approach Delay (s) | | 46.0 | | | 60.3 | | | 37.8 | | | 45.2 | | |
| Approach LOS | | D | | | E | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 47.9 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.93 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 103.2 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 74.1% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020 PM + Project Mitigated



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|-------|-------|------|------|------|------|------|------|------|------|---------------------------|-----|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1800 | 899 | 408 | 956 | 0 | 0 | 0 | 547 | 0 | 0 | 1039 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1957 | 977 | 443 | 1039 | 0 | 0 | 0 | 595 | 0 | 0 | 1129 | |
| RTOR Reduction (vph) | 0 | 0 | 139 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 133 | |
| Lane Group Flow (vph) | 0 | 1957 | 838 | 443 | 1039 | 0 | 0 | 0 | 595 | 0 | 0 | 996 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 4 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 58.0 | 58.0 | 33.0 | 60.5 | | | | 33.0 | | | 33.0 | |
| Effective Green, g (s) | | 58.0 | 58.0 | 33.0 | 60.5 | | | | 33.0 | | | 33.0 | |
| Actuated g/C Ratio | | 0.58 | 0.58 | 0.33 | 0.60 | | | | 0.33 | | | 0.33 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1945 | 1532 | 1037 | 2029 | | | | 961 | | | 919 | |
| v/s Ratio Prot | | c0.58 | | 0.14 | 0.31 | | | | 0.20 | | | c0.36 | |
| v/s Ratio Perm | | | 0.32 | | | | | | | | | | |
| v/c Ratio | | 1.01 | 0.55 | 0.43 | 0.51 | | | | 0.62 | | | 1.08 | |
| Uniform Delay, d1 | | 21.0 | 12.9 | 26.1 | 11.3 | | | | 28.2 | | | 33.5 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 21.9 | 0.4 | 0.3 | 0.2 | | | | 1.2 | | | 55.2 | |
| Delay (s) | | 42.9 | 13.3 | 26.4 | 11.5 | | | | 29.4 | | | 88.7 | |
| Level of Service | | D | B | C | B | | | | C | | | F | |
| Approach Delay (s) | | 33.1 | | | 16.0 | | | 29.4 | | | 88.7 | | |
| Approach LOS | | C | | | B | | | C | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 38.8 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 1.03 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 76.4% | | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: San Leandro Blvd & Marina Blvd

2020 PM + Project Mitigated

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|--------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 820 | 621 | 536 | 4 | 223 | 38 | 225 | 746 | 14 | 65 | 933 | 278 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1737 | 1477 | 1652 | 3528 | | 1652 | 3176 | |
| Flt Permitted | 0.27 | 1.00 | 1.00 | | 0.99 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 470 | 1739 | 1770 | | 1718 | 1477 | 1652 | 3528 | | 1652 | 3176 | |
| 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) | 891 | 675 | 583 | 4 | 242 | 41 | 245 | 811 | 15 | 71 | 1014 | 302 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 1 | 0 | 0 | 27 | 0 |
| Lane Group Flow (vph) | 891 | 675 | 583 | 0 | 246 | 8 | 245 | 825 | 0 | 71 | 1289 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 42.6 | 42.6 | 100.0 | | 19.1 | 19.1 | 17.3 | 35.2 | | 7.7 | 25.1 | |
| Effective Green, g (s) | 42.6 | 42.6 | 100.0 | | 19.1 | 19.1 | 17.3 | 35.2 | | 7.7 | 25.1 | |
| Actuated g/C Ratio | 0.43 | 0.43 | 1.00 | | 0.19 | 0.19 | 0.17 | 0.35 | | 0.08 | 0.25 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 430 | 740 | 1770 | | 328 | 282 | 285 | 1241 | | 127 | 797 | |
| v/s Ratio Prot | c0.40 | 0.39 | | | | | c0.15 | 0.23 | | 0.04 | c0.41 | |
| v/s Ratio Perm | c0.48 | | 0.33 | | 0.14 | 0.01 | | | | | | |
| v/c Ratio | 2.07 | 0.91 | 0.33 | | 0.75 | 0.03 | 0.86 | 0.66 | | 0.56 | 1.62 | |
| Uniform Delay, d1 | 24.1 | 26.9 | 0.0 | | 38.2 | 32.9 | 40.2 | 27.4 | | 44.5 | 37.5 | |
| Progression Factor | 0.94 | 0.56 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 483.2 | 1.9 | 0.0 | | 9.8 | 0.1 | 21.8 | 2.8 | | 5.3 | 283.6 | |
| Delay (s) | 505.8 | 16.9 | 0.0 | | 48.0 | 33.0 | 62.0 | 30.2 | | 49.8 | 321.1 | |
| Level of Service | F | B | A | | D | C | E | C | | D | F | |
| Approach Delay (s) | | 215.0 | | | 45.9 | | | 37.5 | | | 307.2 | |
| Approach LOS | | F | | | D | | | D | | | F | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 192.4 | | | | | | | | | F |
| HCM 2000 Volume to Capacity ratio | | | 1.74 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | | | | | | | 19.0 | |
| Intersection Capacity Utilization | | | 123.9% | | | | | | | | | H |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

MOVEMENT SUMMARY

Site: 2020+Proj PM

#19 Monarch Bay Drive & Mulford Point Drive Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|----------------------|------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Monarch Bay Drive | | | | | | | | | | | |
| 3 | L | 109 | 2.0 | 0.249 | 7.0 | LOS A | 1.1 | 28.6 | 0.60 | 0.90 | 26.6 |
| 8 | T | 99 | 2.0 | 0.249 | 7.0 | LOS A | 1.1 | 28.6 | 0.60 | 0.72 | 29.1 |
| Approach | | 208 | 2.0 | 0.249 | 7.0 | LOS A | 1.1 | 28.6 | 0.60 | 0.81 | 27.7 |
| North: Monarch Bay Drive | | | | | | | | | | | |
| 4 | T | 179 | 2.0 | 0.329 | 5.9 | LOS A | 1.9 | 48.5 | 0.33 | 0.46 | 30.2 |
| 14 | R | 236 | 2.0 | 0.329 | 5.9 | LOS A | 1.9 | 48.5 | 0.33 | 0.53 | 29.7 |
| Approach | | 415 | 2.0 | 0.329 | 5.9 | LOS A | 1.9 | 48.5 | 0.33 | 0.50 | 29.9 |
| West: Mulford Point Drive | | | | | | | | | | | |
| 5 | L | 517 | 2.0 | 0.569 | 9.9 | LOS A | 4.3 | 110.3 | 0.57 | 0.72 | 25.1 |
| 12 | R | 151 | 2.0 | 0.569 | 9.9 | LOS A | 4.3 | 110.3 | 0.57 | 0.60 | 26.9 |
| Approach | | 668 | 2.0 | 0.569 | 9.9 | LOS A | 4.3 | 110.3 | 0.57 | 0.69 | 25.5 |
| All Vehicles | | 1291 | 2.0 | 0.569 | 8.1 | LOS A | 4.3 | 110.3 | 0.50 | 0.65 | 27.1 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
28: Alvarado St & Aladdin Ave

2020 PM + Project Mitigated

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|-------|-------|------|------|-------|------|------|------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 311 | 4 | 556 | 16 | 5 | 12 | 207 | 402 | 1 | 3 | 452 | 87 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 11 | 11 | 10 | 13 | 13 | 10 | 10 | 11 | 11 | 11 | 11 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.85 | | 1.00 | 0.89 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1499 | | 1652 | 1529 | | 1652 | 3240 | 1447 | 1711 | 3284 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 1499 | | 1652 | 1529 | | 1652 | 3240 | 1447 | 1711 | 3284 | |
| 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) | 338 | 4 | 604 | 17 | 5 | 13 | 225 | 437 | 1 | 3 | 491 | 95 |
| RTOR Reduction (vph) | 0 | 235 | 0 | 0 | 11 | 0 | 0 | 0 | 1 | 0 | 15 | 0 |
| Lane Group Flow (vph) | 338 | 373 | 0 | 17 | 7 | 0 | 225 | 437 | 0 | 3 | 571 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 2 | | | 9 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 4% | 2% |
| Bus Blockages (#/hr) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | 0 | 0 | | | | | | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | 8 | | | |
| Actuated Green, G (s) | 20.3 | 33.7 | | 1.4 | 14.8 | | 13.2 | 36.3 | 36.3 | 0.7 | 23.8 | |
| Effective Green, g (s) | 20.3 | 33.7 | | 1.4 | 14.8 | | 13.2 | 36.3 | 36.3 | 0.7 | 23.8 | |
| Actuated g/C Ratio | 0.23 | 0.38 | | 0.02 | 0.17 | | 0.15 | 0.41 | 0.41 | 0.01 | 0.27 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 378 | 570 | | 26 | 255 | | 246 | 1327 | 592 | 13 | 882 | |
| v/s Ratio Prot | c0.20 | c0.25 | | 0.01 | 0.00 | | c0.14 | 0.13 | | 0.00 | c0.17 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | |
| v/c Ratio | 0.89 | 0.65 | | 0.65 | 0.03 | | 0.91 | 0.33 | 0.00 | 0.23 | 0.65 | |
| Uniform Delay, d1 | 33.1 | 22.6 | | 43.4 | 30.9 | | 37.1 | 17.8 | 15.4 | 43.7 | 28.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 23.8 | 3.6 | | 58.8 | 0.1 | | 36.6 | 0.3 | 0.0 | 18.2 | 2.2 | |
| Delay (s) | 56.9 | 26.2 | | 102.2 | 31.0 | | 73.7 | 18.1 | 15.4 | 61.8 | 30.9 | |
| Level of Service | E | C | | F | C | | E | B | B | E | C | |
| Approach Delay (s) | | 37.2 | | | 65.6 | | | 37.0 | | | 31.1 | |
| Approach LOS | | D | | | E | | | D | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 36.0 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.79 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 88.6 | | | | | | | | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | | | 72.0% | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

2020 + Project Mitigated
Saturday

HCM Signalized Intersection Capacity Analysis
10: Aurora Drive & Marina Boulevard

2020+Project Saturday Mitigated

8/21/2014



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|-------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Volume (vph) | 24 | 395 | 14 | 22 | 596 | 18 | 19 | 18 | 40 | 14 | 18 | 24 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | | 1.00 | | | 1.00 | | | 0.93 | | | 0.94 | |
| Flt Protected | | 1.00 | | | 1.00 | | | 0.99 | | | 0.99 | |
| Satd. Flow (prot) | | 1850 | | | 1852 | | | 1713 | | | 1734 | |
| Flt Permitted | | 0.95 | | | 0.98 | | | 0.90 | | | 0.90 | |
| Satd. Flow (perm) | | 1763 | | | 1814 | | | 1564 | | | 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) | 26 | 429 | 15 | 24 | 648 | 20 | 21 | 20 | 43 | 15 | 20 | 26 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 34 | 0 | 0 | 21 | 0 |
| Lane Group Flow (vph) | 0 | 468 | 0 | 0 | 690 | 0 | 0 | 50 | 0 | 0 | 40 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 17.5 | | | 17.5 | | | 6.7 | | | 6.7 | |
| Effective Green, g (s) | | 17.5 | | | 17.5 | | | 6.7 | | | 6.7 | |
| Actuated g/C Ratio | | 0.53 | | | 0.53 | | | 0.20 | | | 0.20 | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 929 | | | 956 | | | 315 | | | 319 | |
| v/s Ratio Prot | | | | | | | | | | | | |
| v/s Ratio Perm | | 0.27 | | | c0.38 | | | c0.03 | | | 0.03 | |
| v/c Ratio | | 0.50 | | | 0.72 | | | 0.16 | | | 0.13 | |
| Uniform Delay, d1 | | 5.1 | | | 6.0 | | | 10.9 | | | 10.9 | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 0.4 | | | 2.7 | | | 0.2 | | | 0.2 | |
| Delay (s) | | 5.5 | | | 8.7 | | | 11.2 | | | 11.0 | |
| Level of Service | | A | | | A | | | B | | | B | |
| Approach Delay (s) | | 5.5 | | | 8.7 | | | 11.2 | | | 11.0 | |
| Approach LOS | | A | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 7.8 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.57 | | |
| Actuated Cycle Length (s) | 33.2 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 52.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

MOVEMENT SUMMARY

Site: 2020+Proj SAT

#10 Marina Boulevard & Aurora Road
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Aurora Road | | | | | | | | | | | |
| 3 | L | 21 | 2.0 | 0.096 | 5.0 | LOS A | 0.4 | 10.1 | 0.52 | 0.84 | 27.6 |
| 8 | T | 20 | 2.0 | 0.096 | 5.0 | LOS A | 0.4 | 10.1 | 0.52 | 0.62 | 30.5 |
| 18 | R | 43 | 2.0 | 0.096 | 5.0 | LOS A | 0.4 | 10.1 | 0.52 | 0.67 | 30.1 |
| Approach | | 84 | 2.0 | 0.096 | 5.0 | LOS A | 0.4 | 10.1 | 0.52 | 0.70 | 29.5 |
| East: Marina Boulevard | | | | | | | | | | | |
| 1 | L | 24 | 2.0 | 0.524 | 8.3 | LOS A | 4.2 | 106.7 | 0.34 | 0.81 | 26.1 |
| 6 | T | 648 | 2.0 | 0.524 | 8.3 | LOS A | 4.2 | 106.7 | 0.34 | 0.44 | 28.7 |
| 16 | R | 20 | 2.0 | 0.524 | 8.3 | LOS A | 4.2 | 106.7 | 0.34 | 0.52 | 28.3 |
| Approach | | 691 | 2.0 | 0.524 | 8.3 | LOS A | 4.2 | 106.7 | 0.34 | 0.46 | 28.6 |
| North: Aurora Road | | | | | | | | | | | |
| 7 | L | 15 | 2.0 | 0.087 | 6.1 | LOS A | 0.3 | 8.7 | 0.60 | 0.90 | 27.1 |
| 4 | T | 20 | 2.0 | 0.087 | 6.1 | LOS A | 0.3 | 8.7 | 0.60 | 0.72 | 29.7 |
| 14 | R | 26 | 2.0 | 0.087 | 6.1 | LOS A | 0.3 | 8.7 | 0.60 | 0.76 | 29.4 |
| Approach | | 61 | 2.0 | 0.087 | 6.1 | LOS A | 0.3 | 8.7 | 0.60 | 0.78 | 28.9 |
| West: Marina Boulevard | | | | | | | | | | | |
| 5 | L | 26 | 2.0 | 0.354 | 6.0 | LOS A | 2.2 | 55.7 | 0.24 | 0.85 | 27.1 |
| 2 | T | 429 | 2.0 | 0.354 | 6.0 | LOS A | 2.2 | 55.7 | 0.24 | 0.43 | 30.2 |
| 12 | R | 15 | 2.0 | 0.354 | 6.0 | LOS A | 2.2 | 55.7 | 0.24 | 0.51 | 29.7 |
| Approach | | 471 | 2.0 | 0.354 | 6.0 | LOS A | 2.2 | 55.7 | 0.24 | 0.46 | 30.0 |
| All Vehicles | | 1307 | 2.0 | 0.524 | 7.1 | LOS A | 4.2 | 106.7 | 0.33 | 0.49 | 29.2 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd

2020+Project Saturday Mitigated

8/21/2014



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations | ↖ | ↖↗ | | ↖ | ↖ | ↖ | ↖ | ↖↗ | ↖ | ↖ | ↖↗ | |
| Volume (vph) | 186 | 307 | 52 | 203 | 455 | 159 | 50 | 254 | 179 | 153 | 266 | 231 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 3223 | | 1620 | 1739 | 1399 | 1652 | 3240 | 1332 | 1620 | 2852 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 3223 | | 1620 | 1739 | 1399 | 1652 | 3240 | 1332 | 1620 | 2852 | |
| 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) | 202 | 334 | 57 | 221 | 495 | 173 | 54 | 276 | 195 | 166 | 289 | 251 |
| RTOR Reduction (vph) | 0 | 9 | 0 | 0 | 0 | 90 | 0 | 0 | 160 | 0 | 125 | 0 |
| Lane Group Flow (vph) | 202 | 382 | 0 | 221 | 495 | 83 | 54 | 276 | 35 | 166 | 415 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 17.8 | 24.8 | | 19.2 | 26.2 | 26.2 | 8.1 | 17.1 | 17.1 | 16.5 | 25.5 | |
| Effective Green, g (s) | 17.8 | 24.8 | | 19.2 | 26.2 | 26.2 | 8.1 | 17.1 | 17.1 | 16.5 | 25.5 | |
| Actuated g/C Ratio | 0.19 | 0.26 | | 0.20 | 0.27 | 0.27 | 0.08 | 0.18 | 0.18 | 0.17 | 0.27 | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 307 | 836 | | 325 | 476 | 383 | 139 | 579 | 238 | 279 | 760 | |
| v/s Ratio Prot | 0.12 | 0.12 | | c0.14 | c0.28 | | 0.03 | 0.09 | | c0.10 | c0.15 | |
| v/s Ratio Perm | | | | | | 0.06 | | | 0.03 | | | |
| v/c Ratio | 0.66 | 0.46 | | 0.68 | 1.04 | 0.22 | 0.39 | 0.48 | 0.15 | 0.59 | 0.55 | |
| Uniform Delay, d1 | 36.1 | 29.7 | | 35.4 | 34.7 | 26.8 | 41.4 | 35.2 | 33.1 | 36.5 | 30.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.6 | 0.5 | | 6.2 | 52.0 | 0.4 | 2.4 | 0.8 | 0.4 | 4.0 | 1.0 | |
| Delay (s) | 41.6 | 30.3 | | 41.6 | 86.7 | 27.2 | 43.9 | 36.1 | 33.5 | 40.4 | 31.1 | |
| Level of Service | D | C | | D | F | C | D | D | C | D | C | |
| Approach Delay (s) | | 34.2 | | | 63.9 | | | 35.9 | | | 33.3 | |
| Approach LOS | | C | | | E | | | D | | | C | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 44.0 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.78 | | |
| Actuated Cycle Length (s) | 95.6 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 69.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2020+Project Saturday Mitigated

8/21/2014



















| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|------|------|---------------------------|------|------|------|------|------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1201 | 538 | 476 | 952 | 0 | 0 | 0 | 480 | 0 | 0 | 1042 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 1305 | 585 | 517 | 1035 | 0 | 0 | 0 | 522 | 0 | 0 | 1133 |
| RTOR Reduction (vph) | 0 | 0 | 219 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| Lane Group Flow (vph) | 0 | 1305 | 366 | 517 | 1035 | 0 | 0 | 0 | 522 | 0 | 0 | 1069 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 4 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 34.6 | 34.6 | 32.7 | 37.1 | | | | 32.7 | | | 32.7 |
| Effective Green, g (s) | | 34.6 | 34.6 | 32.7 | 37.1 | | | | 32.7 | | | 32.7 |
| Actuated g/C Ratio | | 0.45 | 0.45 | 0.43 | 0.49 | | | | 0.43 | | | 0.43 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1521 | 1198 | 1347 | 1631 | | | | 1249 | | | 1194 |
| v/s Ratio Prot | | c0.39 | | 0.16 | 0.31 | | | | 0.18 | | | c0.38 |
| v/s Ratio Perm | | | 0.14 | | | | | | | | | |
| v/c Ratio | | 0.86 | 0.31 | 0.38 | 0.63 | | | | 0.42 | | | 0.90 |
| Uniform Delay, d1 | | 18.7 | 13.2 | 14.9 | 14.6 | | | | 15.2 | | | 20.2 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 5.0 | 0.1 | 0.2 | 0.8 | | | | 0.2 | | | 8.9 |
| Delay (s) | | 23.7 | 13.4 | 15.1 | 15.4 | | | | 15.4 | | | 29.1 |
| Level of Service | | C | B | B | B | | | | B | | | C |
| Approach Delay (s) | | 20.5 | | | 15.3 | | | 15.4 | | | 29.1 | |
| Approach LOS | | C | | | B | | | B | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 20.3 | | | HCM 2000 Level of Service | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.88 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 76.3 | | | Sum of lost time (s) | | | 9.0 | | | |
| Intersection Capacity Utilization | | | 69.9% | | | ICU Level of Service | | | C | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

2035 + Project Mitigated AM

HCM Signalized Intersection Capacity Analysis
 10: Aurora Drive & Marina Boulevard

2035 AM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|-----|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  | | |  | | |  | | |
| Volume (vph) | 46 | 310 | 12 | 28 | 575 | 80 | 15 | 131 | 52 | 46 | 51 | 25 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Frt | | 1.00 | | | 0.98 | | | 0.96 | | | 0.97 | | |
| Flt Protected | | 0.99 | | | 1.00 | | | 1.00 | | | 0.98 | | |
| Satd. Flow (prot) | | 1843 | | | 1830 | | | 1789 | | | 1778 | | |
| Flt Permitted | | 0.87 | | | 0.98 | | | 0.97 | | | 0.85 | | |
| Satd. Flow (perm) | | 1621 | | | 1791 | | | 1747 | | | 1536 | | |
| 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) | 50 | 337 | 13 | 30 | 625 | 87 | 16 | 142 | 57 | 50 | 55 | 27 | |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 26 | 0 | 0 | 18 | 0 | |
| Lane Group Flow (vph) | 0 | 399 | 0 | 0 | 736 | 0 | 0 | 189 | 0 | 0 | 114 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | | |
| Actuated Green, G (s) | | 27.9 | | | 27.9 | | | 12.1 | | | 12.1 | | |
| Effective Green, g (s) | | 27.9 | | | 27.9 | | | 12.1 | | | 12.1 | | |
| Actuated g/C Ratio | | 0.57 | | | 0.57 | | | 0.25 | | | 0.25 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | | |
| Lane Grp Cap (vph) | | 922 | | | 1019 | | | 431 | | | 379 | | |
| v/s Ratio Prot | | | | | | | | | | | | | |
| v/s Ratio Perm | | 0.25 | | | c0.41 | | | c0.11 | | | 0.07 | | |
| v/c Ratio | | 0.43 | | | 0.72 | | | 0.44 | | | 0.30 | | |
| Uniform Delay, d1 | | 6.0 | | | 7.7 | | | 15.6 | | | 15.0 | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Incremental Delay, d2 | | 0.3 | | | 2.6 | | | 0.7 | | | 0.4 | | |
| Delay (s) | | 6.4 | | | 10.3 | | | 16.3 | | | 15.5 | | |
| Level of Service | | A | | | B | | | B | | | B | | |
| Approach Delay (s) | | 6.4 | | | 10.3 | | | 16.3 | | | 15.5 | | |
| Approach LOS | | A | | | B | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 10.6 | | | | | | | | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.64 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 49.0 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 67.8% | | | | | | | | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

MOVEMENT SUMMARY

Site: 2035+Proj AM

#10 Marina Boulevard & Aurora Road Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Aurora Road | | | | | | | | | | | |
| 3 | L | 16 | 2.0 | 0.238 | 6.4 | LOS A | 1.1 | 27.9 | 0.56 | 0.91 | 27.1 |
| 8 | T | 142 | 2.0 | 0.238 | 6.4 | LOS A | 1.1 | 27.9 | 0.56 | 0.68 | 29.8 |
| 18 | R | 57 | 2.0 | 0.238 | 6.4 | LOS A | 1.1 | 27.9 | 0.56 | 0.72 | 29.4 |
| Approach | | 215 | 2.0 | 0.238 | 6.4 | LOS A | 1.1 | 27.9 | 0.56 | 0.71 | 29.5 |
| East: Marina Boulevard | | | | | | | | | | | |
| 1 | L | 30 | 2.0 | 0.651 | 12.1 | LOS B | 5.9 | 150.7 | 0.68 | 0.83 | 24.7 |
| 6 | T | 625 | 2.0 | 0.651 | 12.1 | LOS B | 5.9 | 150.7 | 0.68 | 0.66 | 26.6 |
| 16 | R | 87 | 2.0 | 0.651 | 12.1 | LOS B | 5.9 | 150.7 | 0.68 | 0.70 | 26.3 |
| Approach | | 742 | 2.0 | 0.651 | 12.1 | LOS B | 5.9 | 150.7 | 0.68 | 0.67 | 26.5 |
| North: Aurora Road | | | | | | | | | | | |
| 7 | L | 50 | 2.0 | 0.186 | 7.1 | LOS A | 0.8 | 19.7 | 0.62 | 0.94 | 26.6 |
| 4 | T | 55 | 2.0 | 0.186 | 7.1 | LOS A | 0.8 | 19.7 | 0.62 | 0.77 | 29.0 |
| 14 | R | 27 | 2.0 | 0.186 | 7.1 | LOS A | 0.8 | 19.7 | 0.62 | 0.81 | 28.7 |
| Approach | | 133 | 2.0 | 0.186 | 7.1 | LOS A | 0.8 | 19.7 | 0.62 | 0.84 | 28.0 |
| West: Marina Boulevard | | | | | | | | | | | |
| 5 | L | 50 | 2.0 | 0.325 | 6.0 | LOS A | 1.9 | 47.2 | 0.36 | 0.82 | 27.2 |
| 2 | T | 337 | 2.0 | 0.325 | 6.0 | LOS A | 1.9 | 47.2 | 0.36 | 0.48 | 30.2 |
| 12 | R | 13 | 2.0 | 0.325 | 6.0 | LOS A | 1.9 | 47.2 | 0.36 | 0.55 | 29.7 |
| Approach | | 400 | 2.0 | 0.325 | 6.0 | LOS A | 1.9 | 47.2 | 0.36 | 0.53 | 29.7 |
| All Vehicles | | 1490 | 2.0 | 0.651 | 9.2 | LOS A | 5.9 | 150.7 | 0.57 | 0.65 | 27.8 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2035 AM + Project Mitigated

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|------|-------|------|-------|------|-------|-------|------|-------|------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 136 | 306 | 76 | 158 | 559 | 377 | 13 | 664 | 248 | 223 | 345 | 105 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 | |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 3193 | | 1620 | 1739 | 1393 | 1652 | 3240 | 1331 | 1620 | 2963 | | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 1652 | 3193 | | 1620 | 1739 | 1393 | 1652 | 3240 | 1331 | 1620 | 2963 | | |
| 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) | 148 | 333 | 83 | 172 | 608 | 410 | 14 | 722 | 270 | 242 | 375 | 114 | |
| RTOR Reduction (vph) | 0 | 18 | 0 | 0 | 0 | 214 | 0 | 0 | 132 | 0 | 22 | 0 | |
| Lane Group Flow (vph) | 148 | 398 | 0 | 172 | 608 | 196 | 14 | 722 | 138 | 242 | 467 | 0 | |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% | |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | | |
| Permitted Phases | | | | | | 4 | | | 2 | | | | |
| Actuated Green, G (s) | 11.8 | 36.6 | | 18.2 | 43.0 | 43.0 | 1.6 | 31.0 | 31.0 | 18.9 | 48.3 | | |
| Effective Green, g (s) | 11.8 | 36.6 | | 18.2 | 43.0 | 43.0 | 1.6 | 31.0 | 31.0 | 18.9 | 48.3 | | |
| Actuated g/C Ratio | 0.10 | 0.30 | | 0.15 | 0.35 | 0.35 | 0.01 | 0.25 | 0.25 | 0.15 | 0.39 | | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | |
| Lane Grp Cap (vph) | 158 | 952 | | 240 | 609 | 488 | 21 | 818 | 336 | 249 | 1166 | | |
| v/s Ratio Prot | c0.09 | 0.12 | | 0.11 | c0.35 | | 0.01 | c0.22 | | c0.15 | 0.16 | | |
| v/s Ratio Perm | | | | | | 0.14 | | | 0.10 | | | | |
| v/c Ratio | 0.94 | 0.42 | | 0.72 | 1.00 | 0.40 | 0.67 | 0.88 | 0.41 | 0.97 | 0.40 | | |
| Uniform Delay, d1 | 55.1 | 34.5 | | 49.8 | 39.8 | 30.1 | 60.3 | 44.1 | 38.2 | 51.6 | 26.8 | | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 53.1 | 0.4 | | 10.4 | 35.8 | 0.7 | 63.2 | 11.3 | 1.1 | 49.1 | 0.3 | | |
| Delay (s) | 108.2 | 34.9 | | 60.2 | 75.6 | 30.9 | 123.5 | 55.4 | 39.3 | 100.7 | 27.1 | | |
| Level of Service | F | C | | E | E | C | F | E | D | F | C | | |
| Approach Delay (s) | | 54.1 | | | 58.0 | | | 52.1 | | | 51.5 | | |
| Approach LOS | | D | | | E | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 54.3 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.95 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 122.7 | | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 83.0% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

2035 AM + Project Mitigated

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|-------|-------|------|-------|------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 38 | 711 | 77 | 1060 | 1116 | 237 | 112 | 204 | 590 | 164 | 173 | 33 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 |
| Total Lost time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 4.0 | 4.0 | 5.5 | 5.5 |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 4587 | | 3255 | 3146 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1469 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1562 | 4587 | | 3255 | 3146 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1469 |
| 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) | 41 | 773 | 84 | 1152 | 1213 | 258 | 122 | 222 | 641 | 178 | 188 | 36 |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| Lane Group Flow (vph) | 41 | 846 | 0 | 1152 | 1457 | 0 | 122 | 222 | 641 | 178 | 188 | 5 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | 8 |
| Actuated Green, G (s) | 5.2 | 27.2 | | 35.6 | 57.6 | | 14.1 | 16.8 | 56.4 | 11.4 | 14.1 | 14.1 |
| Effective Green, g (s) | 5.2 | 27.2 | | 35.6 | 57.6 | | 14.1 | 16.8 | 56.4 | 11.4 | 14.1 | 14.1 |
| Actuated g/C Ratio | 0.05 | 0.25 | | 0.32 | 0.52 | | 0.13 | 0.15 | 0.51 | 0.10 | 0.13 | 0.13 |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 73 | 1134 | | 1053 | 1647 | | 215 | 512 | 1387 | 337 | 415 | 188 |
| v/s Ratio Prot | 0.03 | c0.18 | | c0.35 | c0.46 | | c0.07 | 0.07 | c0.24 | 0.05 | 0.06 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 |
| v/c Ratio | 0.56 | 0.75 | | 1.09 | 0.88 | | 0.57 | 0.43 | 0.46 | 0.53 | 0.45 | 0.02 |
| Uniform Delay, d1 | 51.3 | 38.2 | | 37.2 | 23.2 | | 45.1 | 42.3 | 17.1 | 46.7 | 44.4 | 41.9 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.93 | 0.61 | 0.22 | 1.01 | 0.71 | 1.00 |
| Incremental Delay, d2 | 11.5 | 4.5 | | 57.1 | 7.3 | | 4.1 | 0.8 | 0.3 | 1.8 | 1.0 | 0.1 |
| Delay (s) | 62.7 | 42.7 | | 94.3 | 30.6 | | 45.9 | 26.4 | 4.0 | 48.8 | 32.6 | 42.0 |
| Level of Service | E | D | | F | C | | D | C | A | D | C | D |
| Approach Delay (s) | | 43.6 | | | 58.5 | | | 14.3 | | | 40.6 | |
| Approach LOS | | D | | | E | | | B | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 45.5 | | | | | | | | | D |
| HCM 2000 Volume to Capacity ratio | | | 0.87 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 110.0 | | | | | | | | | 19.0 |
| Intersection Capacity Utilization | | | 73.4% | | | | | | | | | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035 AM + Project Mitigated



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|------|------|-------|------|-------|------|------|------|------|------|------|---------------------------|-----|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ | |
| Volume (vph) | 0 | 1089 | 599 | 396 | 1550 | 0 | 0 | 0 | 458 | 0 | 0 | 1116 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 | |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 | |
| 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 | 1184 | 651 | 430 | 1685 | 0 | 0 | 0 | 498 | 0 | 0 | 1213 | |
| RTOR Reduction (vph) | 0 | 0 | 262 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | |
| Lane Group Flow (vph) | 0 | 1184 | 389 | 430 | 1685 | 0 | 0 | 0 | 498 | 0 | 0 | 1201 | |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% | |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot | |
| Protected Phases | | 2 | | 4 | 6 | | | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | | | | | | | | |
| Actuated Green, G (s) | | 37.9 | 37.9 | 33.1 | 40.4 | | | | 33.1 | | | 33.1 | |
| Effective Green, g (s) | | 37.9 | 37.9 | 33.1 | 40.4 | | | | 33.1 | | | 33.1 | |
| Actuated g/C Ratio | | 0.47 | 0.47 | 0.41 | 0.50 | | | | 0.41 | | | 0.41 | |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 1589 | 1251 | 1300 | 1694 | | | | 1206 | | | 1153 | |
| v/s Ratio Prot | | 0.35 | | 0.14 | c0.50 | | | | 0.17 | | | c0.43 | |
| v/s Ratio Perm | | | 0.15 | | | | | | | | | | |
| v/c Ratio | | 0.75 | 0.31 | 0.33 | 0.99 | | | | 0.41 | | | 1.04 | |
| Uniform Delay, d1 | | 17.1 | 13.0 | 15.9 | 19.7 | | | | 16.6 | | | 23.4 | |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 1.9 | 0.1 | 0.2 | 20.5 | | | | 0.2 | | | 38.1 | |
| Delay (s) | | 19.1 | 13.1 | 16.1 | 40.2 | | | | 16.8 | | | 61.5 | |
| Level of Service | | B | B | B | D | | | | B | | | E | |
| Approach Delay (s) | | 17.0 | | | 35.3 | | | 16.8 | | | 61.5 | | |
| Approach LOS | | B | | | D | | | B | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 33.3 | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 1.04 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 80.0 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 89.0% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 18: San Leandro Blvd & Marina Blvd

2035 AM + Project Mitigated



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|------|------|-------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 443 | 253 | 332 | 5 | 463 | 69 | 456 | 1090 | 7 | 88 | 788 | 458 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1738 | 1480 | 1652 | 3535 | | 1652 | 3100 | |
| Flt Permitted | 0.16 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 273 | 1739 | 1770 | | 1733 | 1480 | 1652 | 3535 | | 1652 | 3100 | |
| 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) | 482 | 275 | 361 | 5 | 503 | 75 | 496 | 1185 | 8 | 96 | 857 | 498 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 1 | 0 | 0 | 88 | 0 |
| Lane Group Flow (vph) | 482 | 275 | 361 | 0 | 508 | 17 | 496 | 1192 | 0 | 96 | 1267 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 40.0 | 40.0 | 95.0 | | 21.5 | 21.5 | 21.0 | 32.4 | | 8.1 | 19.0 | |
| Effective Green, g (s) | 40.0 | 40.0 | 95.0 | | 21.5 | 21.5 | 21.0 | 32.4 | | 8.1 | 19.0 | |
| Actuated g/C Ratio | 0.42 | 0.42 | 1.00 | | 0.23 | 0.23 | 0.22 | 0.34 | | 0.09 | 0.20 | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | |
| Lane Grp Cap (vph) | 325 | 732 | 1770 | | 392 | 334 | 365 | 1205 | | 140 | 620 | |
| v/s Ratio Prot | c0.23 | 0.16 | | | | | c0.30 | 0.34 | | 0.06 | c0.41 | |
| v/s Ratio Perm | c0.40 | | 0.20 | | 0.29 | 0.01 | | | | | | |
| v/c Ratio | 1.48 | 0.38 | 0.20 | | 1.30 | 0.05 | 1.36 | 0.99 | | 0.69 | 2.04 | |
| Uniform Delay, d1 | 25.8 | 18.9 | 0.0 | | 36.8 | 28.8 | 37.0 | 31.1 | | 42.2 | 38.0 | |
| Progression Factor | 0.55 | 0.53 | 1.00 | | 1.00 | 1.00 | 1.09 | 0.77 | | 0.94 | 0.94 | |
| Incremental Delay, d2 | 229.8 | 0.3 | 0.2 | | 150.9 | 0.1 | 178.1 | 23.2 | | 12.9 | 475.2 | |
| Delay (s) | 244.0 | 10.4 | 0.2 | | 187.7 | 28.9 | 218.5 | 47.2 | | 52.5 | 510.9 | |
| Level of Service | F | B | A | | F | C | F | D | | D | F | |
| Approach Delay (s) | | 107.8 | | | 167.2 | | | 97.5 | | | 480.5 | |
| Approach LOS | | F | | | F | | | F | | | F | |

Intersection Summary

| | | | |
|-----------------------------------|--------|---------------------------|------|
| HCM 2000 Control Delay | 223.1 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.63 | | |
| Actuated Cycle Length (s) | 95.0 | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | 127.4% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

MOVEMENT SUMMARY

Site: 2035+Proj AM

#19 Monarch Bay Drive & Mulford Point Drive Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|----------------------|------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Monarch Bay Drive | | | | | | | | | | | |
| 3 | L | 142 | 2.0 | 0.175 | 4.4 | LOS A | 0.8 | 21.5 | 0.30 | 0.73 | 27.7 |
| 8 | T | 74 | 2.0 | 0.175 | 4.4 | LOS A | 0.8 | 21.5 | 0.30 | 0.43 | 31.0 |
| Approach | | 216 | 2.0 | 0.175 | 4.4 | LOS A | 0.8 | 21.5 | 0.30 | 0.62 | 28.7 |
| North: Monarch Bay Drive | | | | | | | | | | | |
| 4 | T | 126 | 2.0 | 0.544 | 9.1 | LOS A | 4.2 | 105.6 | 0.50 | 0.52 | 28.0 |
| 14 | R | 538 | 2.0 | 0.544 | 9.1 | LOS A | 4.2 | 105.6 | 0.50 | 0.57 | 27.7 |
| Approach | | 664 | 2.0 | 0.544 | 9.1 | LOS A | 4.2 | 105.6 | 0.50 | 0.56 | 27.8 |
| West: Mulford Point Drive | | | | | | | | | | | |
| 5 | L | 128 | 2.0 | 0.145 | 4.1 | LOS A | 0.7 | 17.4 | 0.29 | 0.69 | 27.8 |
| 12 | R | 52 | 2.0 | 0.145 | 4.1 | LOS A | 0.7 | 17.4 | 0.29 | 0.49 | 30.6 |
| Approach | | 180 | 2.0 | 0.145 | 4.1 | LOS A | 0.7 | 17.4 | 0.29 | 0.63 | 28.5 |
| All Vehicles | | 1061 | 2.0 | 0.544 | 7.3 | LOS A | 4.2 | 105.6 | 0.42 | 0.59 | 28.1 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

















Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

2035 + Project Mitigated PM

HCM Signalized Intersection Capacity Analysis
10: Aurora Drive & Marina Boulevard

2035 PM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|-----|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations | |  | | |  | | |  | | |  | | |
| Volume (vph) | 43 | 612 | 16 | 44 | 434 | 51 | 16 | 43 | 33 | 26 | 39 | 33 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Frt | | 1.00 | | | 0.99 | | | 0.95 | | | 0.95 | | |
| Flt Protected | | 1.00 | | | 1.00 | | | 0.99 | | | 0.99 | | |
| Satd. Flow (prot) | | 1851 | | | 1831 | | | 1757 | | | 1754 | | |
| Flt Permitted | | 0.95 | | | 0.92 | | | 0.93 | | | 0.89 | | |
| Satd. Flow (perm) | | 1757 | | | 1683 | | | 1650 | | | 1580 | | |
| 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) | 47 | 665 | 17 | 48 | 472 | 55 | 17 | 47 | 36 | 28 | 42 | 36 | |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | |
| Lane Group Flow (vph) | 0 | 728 | 0 | 0 | 571 | 0 | 0 | 70 | 0 | 0 | 76 | 0 | |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | | |
| Actuated Green, G (s) | | 29.9 | | | 29.9 | | | 8.4 | | | 8.4 | | |
| Effective Green, g (s) | | 29.9 | | | 29.9 | | | 8.4 | | | 8.4 | | |
| Actuated g/C Ratio | | 0.63 | | | 0.63 | | | 0.18 | | | 0.18 | | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | | |
| Lane Grp Cap (vph) | | 1110 | | | 1063 | | | 293 | | | 280 | | |
| v/s Ratio Prot | | | | | | | | | | | | | |
| v/s Ratio Perm | | c0.41 | | | 0.34 | | | 0.04 | | | c0.05 | | |
| v/c Ratio | | 0.66 | | | 0.54 | | | 0.24 | | | 0.27 | | |
| Uniform Delay, d1 | | 5.5 | | | 4.8 | | | 16.7 | | | 16.8 | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | |
| Incremental Delay, d2 | | 1.4 | | | 0.5 | | | 0.4 | | | 0.5 | | |
| Delay (s) | | 6.9 | | | 5.4 | | | 17.1 | | | 17.3 | | |
| Level of Service | | A | | | A | | | B | | | B | | |
| Approach Delay (s) | | 6.9 | | | 5.4 | | | 17.1 | | | 17.3 | | |
| Approach LOS | | A | | | A | | | B | | | B | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 7.7 | | | | | | | | | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | | | 0.57 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 47.3 | | | | | | | | | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | | | 60.1% | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

MOVEMENT SUMMARY

Site: 2035+Proj PM

#10 Marina Boulevard & Aurora Road
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|--|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph | |
| South: Aurora Road | | | | | | | | | | | | |
| 3 | L | 17 | 2.0 | 0.151 | 7.1 | LOS A | 0.6 | 15.3 | 0.63 | 0.96 | 26.7 | |
| 8 | T | 47 | 2.0 | 0.151 | 7.1 | LOS A | 0.6 | 15.3 | 0.63 | 0.78 | 29.2 | |
| 18 | R | 36 | 2.0 | 0.151 | 7.1 | LOS A | 0.6 | 15.3 | 0.63 | 0.82 | 28.9 | |
| Approach | | 100 | 2.0 | 0.151 | 7.1 | LOS A | 0.6 | 15.3 | 0.63 | 0.83 | 28.6 | |
| East: Marina Boulevard | | | | | | | | | | | | |
| 1 | L | 48 | 2.0 | 0.456 | 7.5 | LOS A | 3.1 | 79.8 | 0.39 | 0.81 | 26.4 | |
| 6 | T | 472 | 2.0 | 0.456 | 7.5 | LOS A | 3.1 | 79.8 | 0.39 | 0.48 | 29.2 | |
| 16 | R | 55 | 2.0 | 0.456 | 7.5 | LOS A | 3.1 | 79.8 | 0.39 | 0.55 | 28.7 | |
| Approach | | 575 | 2.0 | 0.456 | 7.5 | LOS A | 3.1 | 79.8 | 0.39 | 0.51 | 28.9 | |
| North: Aurora Road | | | | | | | | | | | | |
| 7 | L | 28 | 2.0 | 0.130 | 5.7 | LOS A | 0.5 | 13.8 | 0.56 | 0.88 | 27.3 | |
| 4 | T | 42 | 2.0 | 0.130 | 5.7 | LOS A | 0.5 | 13.8 | 0.56 | 0.67 | 30.0 | |
| 14 | R | 36 | 2.0 | 0.130 | 5.7 | LOS A | 0.5 | 13.8 | 0.56 | 0.72 | 29.7 | |
| Approach | | 107 | 2.0 | 0.130 | 5.7 | LOS A | 0.5 | 13.8 | 0.56 | 0.75 | 29.1 | |
| West: Marina Boulevard | | | | | | | | | | | | |
| 5 | L | 47 | 2.0 | 0.583 | 9.7 | LOS A | 4.9 | 124.0 | 0.49 | 0.79 | 25.6 | |
| 2 | T | 665 | 2.0 | 0.583 | 9.7 | LOS A | 4.9 | 124.0 | 0.49 | 0.51 | 27.9 | |
| 12 | R | 17 | 2.0 | 0.583 | 9.7 | LOS A | 4.9 | 124.0 | 0.49 | 0.57 | 27.5 | |
| Approach | | 729 | 2.0 | 0.583 | 9.7 | LOS A | 4.9 | 124.0 | 0.49 | 0.53 | 27.7 | |
| All Vehicles | | 1511 | 2.0 | 0.583 | 8.4 | LOS A | 4.9 | 124.0 | 0.47 | 0.56 | 28.3 | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).



























Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
11: Doolittle Dr & Marina Blvd























2035 PM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|--|---|---|---|---|---|--|---|---|--|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |   | |  |  |  |  |   |  |  |   |  |
| Volume (vph) | 187 | 477 | 36 | 229 | 404 | 264 | 31 | 563 | 217 | 262 | 692 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 3264 | | 1620 | 1739 | 1393 | 1652 | 3240 | 1331 | 1620 | 2992 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 3264 | | 1620 | 1739 | 1393 | 1652 | 3240 | 1331 | 1620 | 2992 | |
| 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) | 203 | 518 | 39 | 249 | 439 | 287 | 34 | 612 | 236 | 285 | 752 | 158 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 210 | 0 | 0 | 115 | 0 | 15 | 0 |
| Lane Group Flow (vph) | 203 | 552 | 0 | 249 | 439 | 77 | 34 | 612 | 121 | 285 | 895 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 16.3 | 27.7 | | 20.0 | 31.4 | 31.4 | 2.8 | 28.2 | 28.2 | 22.7 | 48.1 | |
| Effective Green, g (s) | 16.3 | 27.7 | | 20.0 | 31.4 | 31.4 | 2.8 | 28.2 | 28.2 | 22.7 | 48.1 | |
| Actuated g/C Ratio | 0.14 | 0.24 | | 0.17 | 0.27 | 0.27 | 0.02 | 0.24 | 0.24 | 0.19 | 0.41 | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 230 | 775 | | 277 | 468 | 375 | 39 | 783 | 321 | 315 | 1234 | |
| v/s Ratio Prot | 0.12 | 0.17 | | c0.15 | c0.25 | | 0.02 | 0.19 | | c0.18 | c0.30 | |
| v/s Ratio Perm | | | | | | 0.06 | | | 0.09 | | | |
| v/c Ratio | 0.88 | 0.71 | | 0.90 | 0.94 | 0.21 | 0.87 | 0.78 | 0.38 | 0.90 | 0.73 | |
| Uniform Delay, d1 | 49.2 | 40.8 | | 47.3 | 41.6 | 33.0 | 56.7 | 41.3 | 36.9 | 45.9 | 28.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 30.9 | 3.3 | | 29.6 | 26.8 | 0.4 | 96.2 | 5.4 | 1.0 | 28.2 | 2.3 | |
| Delay (s) | 80.1 | 44.1 | | 76.9 | 68.4 | 33.3 | 152.9 | 46.7 | 37.9 | 74.1 | 31.0 | |
| Level of Service | F | D | | E | E | C | F | D | D | E | C | |
| Approach Delay (s) | | 53.7 | | | 60.3 | | | 48.4 | | | 41.3 | |
| Approach LOS | | D | | | E | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 50.3 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.90 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 116.6 | | | | | | | | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | | | 77.2% | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Merced St & Marina Blvd

2035 PM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |  |  | |  |  | |  |  |  |  |  |  | |
| Volume (vph) | 59 | 987 | 95 | 906 | 720 | 134 | 221 | 294 | 1199 | 323 | 222 | 41 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 11 | 11 | 10 | 11 | 11 | 11 | 12 | 11 | 10 | 11 | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | | 0.97 | 0.95 | | 1.00 | 0.95 | 0.88 | 0.97 | 0.95 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1562 | 4594 | | 3255 | 3155 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1468 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 1562 | 4594 | | 3255 | 3155 | | 1678 | 3355 | 2706 | 3255 | 3240 | 1468 | |
| 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) | 64 | 1073 | 103 | 985 | 783 | 146 | 240 | 320 | 1303 | 351 | 241 | 45 | |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | |
| Lane Group Flow (vph) | 64 | 1168 | 0 | 985 | 919 | 0 | 240 | 320 | 1303 | 351 | 241 | 6 | |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 2 | | | 2 | |
| Confl. Bikes (#/hr) | | | | | | | | | 3 | | | 4 | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | |
| Bus Blockages (#/hr) | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | pt+ov | Prot | NA | Perm | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | 14 | 3 | 8 | | |
| Permitted Phases | | | | | | | | | | | | 8 | |
| Actuated Green, G (s) | 8.6 | 34.7 | | 45.8 | 71.9 | | 23.5 | 24.2 | 74.0 | 16.3 | 17.0 | 17.0 | |
| Effective Green, g (s) | 8.6 | 36.2 | | 45.8 | 73.4 | | 23.5 | 25.7 | 74.0 | 16.3 | 18.5 | 18.5 | |
| Actuated g/C Ratio | 0.06 | 0.26 | | 0.33 | 0.52 | | 0.17 | 0.18 | 0.53 | 0.12 | 0.13 | 0.13 | |
| Clearance Time (s) | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | | 4.0 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 95 | 1187 | | 1064 | 1654 | | 281 | 615 | 1430 | 378 | 428 | 193 | |
| v/s Ratio Prot | 0.04 | c0.25 | | 0.30 | 0.29 | | c0.14 | 0.10 | c0.48 | 0.11 | 0.07 | | |
| v/s Ratio Perm | | | | | | | | | | | | 0.00 | |
| v/c Ratio | 0.67 | 0.98 | | 0.93 | 0.56 | | 0.85 | 0.52 | 0.91 | 0.93 | 0.56 | 0.03 | |
| Uniform Delay, d1 | 64.3 | 51.6 | | 45.5 | 22.3 | | 56.6 | 51.6 | 30.0 | 61.3 | 57.0 | 52.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 18.7 | 22.5 | | 13.4 | 1.4 | | 22.2 | 1.0 | 9.2 | 28.9 | 2.1 | 0.1 | |
| Delay (s) | 83.0 | 74.1 | | 58.8 | 23.7 | | 78.7 | 52.6 | 39.2 | 90.2 | 59.0 | 53.0 | |
| Level of Service | F | E | | E | C | | E | D | D | F | E | D | |
| Approach Delay (s) | | 74.6 | | | 41.8 | | | 46.6 | | | 75.8 | | |
| Approach LOS | | E | | | D | | | D | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 54.4 | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.97 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 140.0 | | | | | | | | | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | | | 82.6% | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | | | 15 | | | | | | | | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035 PM + Project Mitigated



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|------|-------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1898 | 1059 | 408 | 961 | 0 | 0 | 0 | 592 | 0 | 0 | 1096 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 2063 | 1151 | 443 | 1045 | 0 | 0 | 0 | 643 | 0 | 0 | 1191 |
| RTOR Reduction (vph) | 0 | 0 | 138 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 132 |
| Lane Group Flow (vph) | 0 | 2063 | 1013 | 443 | 1045 | 0 | 0 | 0 | 643 | 0 | 0 | 1059 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 4 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 64.5 | 64.5 | 36.5 | 67.0 | | | | 36.5 | | | 36.5 |
| Effective Green, g (s) | | 64.5 | 64.5 | 36.5 | 67.0 | | | | 36.5 | | | 36.5 |
| Actuated g/C Ratio | | 0.59 | 0.59 | 0.33 | 0.61 | | | | 0.33 | | | 0.33 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1967 | 1549 | 1042 | 2043 | | | | 967 | | | 924 |
| v/s Ratio Prot | | c0.61 | | 0.14 | 0.31 | | | | 0.22 | | | c0.38 |
| v/s Ratio Perm | | | 0.38 | | | | | | | | | |
| v/c Ratio | | 1.05 | 0.65 | 0.43 | 0.51 | | | | 0.66 | | | 1.15 |
| Uniform Delay, d1 | | 22.8 | 15.3 | 28.6 | 12.2 | | | | 31.5 | | | 36.8 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 34.5 | 1.0 | 0.3 | 0.2 | | | | 1.7 | | | 78.4 |
| Delay (s) | | 57.2 | 16.3 | 28.9 | 12.4 | | | | 33.2 | | | 115.2 |
| Level of Service | | E | B | C | B | | | | C | | | F |
| Approach Delay (s) | | 42.6 | | | 17.3 | | | 33.2 | | | 115.2 | |
| Approach LOS | | D | | | B | | | C | | | F | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 49.1 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 1.08 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 80.7% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: San Leandro Blvd & Marina Blvd

2035 PM + Project Mitigated

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|-------|--------|------|------|------|-------|-------|------|------|-------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Volume (vph) | 1073 | 719 | 490 | 4 | 300 | 48 | 241 | 951 | 14 | 87 | 977 | 440 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 10 | 10 | 16 | 10 | 10 | 11 | 10 | 12 | 8 | 10 | 10 | 12 | |
| Total Lost time (s) | 4.5 | 5.0 | 4.0 | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | 0.97 | 1.00 | 1.00 | | 1.00 | 0.99 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.95 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1652 | 1739 | 1770 | | 1738 | 1478 | 1652 | 3530 | | 1652 | 3131 | | |
| Flt Permitted | 0.17 | 1.00 | 1.00 | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 302 | 1739 | 1770 | | 1688 | 1478 | 1652 | 3530 | | 1652 | 3131 | | |
| 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) | 1166 | 782 | 533 | 4 | 326 | 52 | 262 | 1034 | 15 | 95 | 1062 | 478 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1 | 0 | 0 | 51 | 0 | |
| Lane Group Flow (vph) | 1166 | 782 | 533 | 0 | 330 | 11 | 262 | 1048 | 0 | 95 | 1489 | 0 | |
| Confl. Peds. (#/hr) | | | | | | | 14 | | 2 | | | 5 | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | | |
| Turn Type | pm+pt | NA | Free | Perm | NA | Perm | Prot | NA | | Prot | NA | | |
| Protected Phases | 3 | 8 | | | 4 | | 1 | 6 | | 5 | 2 | | |
| Permitted Phases | 8 | | Free | 4 | | 4 | | | | | | | |
| Actuated Green, G (s) | 45.0 | 45.0 | 100.0 | | 21.5 | 21.5 | 17.5 | 32.4 | | 8.1 | 22.5 | | |
| Effective Green, g (s) | 45.0 | 45.0 | 100.0 | | 21.5 | 21.5 | 17.5 | 32.4 | | 8.1 | 22.5 | | |
| Actuated g/C Ratio | 0.45 | 0.45 | 1.00 | | 0.22 | 0.22 | 0.18 | 0.32 | | 0.08 | 0.22 | | |
| Clearance Time (s) | 4.5 | 5.0 | | | 4.5 | 4.5 | 5.0 | 5.0 | | 4.5 | 5.0 | | |
| Vehicle Extension (s) | 3.0 | 4.0 | | | 4.0 | 4.0 | 3.0 | 6.0 | | 3.0 | 6.0 | | |
| Lane Grp Cap (vph) | 399 | 782 | 1770 | | 362 | 317 | 289 | 1143 | | 133 | 704 | | |
| v/s Ratio Prot | c0.57 | 0.45 | | | | | c0.16 | c0.30 | | 0.06 | c0.48 | | |
| v/s Ratio Perm | c0.75 | | 0.30 | | 0.20 | 0.01 | | | | | | | |
| v/c Ratio | 2.92 | 1.00 | 0.30 | | 0.91 | 0.04 | 0.91 | 0.92 | | 0.71 | 2.11 | | |
| Uniform Delay, d1 | 27.0 | 27.5 | 0.0 | | 38.3 | 31.0 | 40.4 | 32.5 | | 44.8 | 38.8 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 871.8 | 32.2 | 0.4 | | 26.8 | 0.1 | 29.7 | 12.9 | | 16.6 | 506.5 | | |
| Delay (s) | 898.9 | 59.7 | 0.4 | | 65.1 | 31.1 | 70.2 | 45.5 | | 61.4 | 545.2 | | |
| Level of Service | F | E | A | | E | C | E | D | | E | F | | |
| Approach Delay (s) | | 441.3 | | | 60.5 | | | 50.4 | | | 517.1 | | |
| Approach LOS | | F | | | E | | | D | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 349.4 | | | | | | | | | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | | | 2.35 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | | | | | | | | Sum of lost time (s) | 19.0 |
| Intersection Capacity Utilization | | | 147.8% | | | | | | | | | ICU Level of Service | H |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

MOVEMENT SUMMARY

Site: 2035+Proj PM

#19 Monarch Bay Drive & Mulford Point Drive Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|----------------------|------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Monarch Bay Drive | | | | | | | | | | | |
| 3 | L | 121 | 2.0 | 0.267 | 7.2 | LOS A | 1.2 | 31.0 | 0.61 | 0.90 | 26.5 |
| 8 | T | 101 | 2.0 | 0.267 | 7.2 | LOS A | 1.2 | 31.0 | 0.61 | 0.73 | 28.9 |
| Approach | | 222 | 2.0 | 0.267 | 7.2 | LOS A | 1.2 | 31.0 | 0.61 | 0.82 | 27.5 |
| North: Monarch Bay Drive | | | | | | | | | | | |
| 4 | T | 180 | 2.0 | 0.325 | 5.9 | LOS A | 1.9 | 47.4 | 0.34 | 0.47 | 30.2 |
| 14 | R | 225 | 2.0 | 0.325 | 5.9 | LOS A | 1.9 | 47.4 | 0.34 | 0.54 | 29.7 |
| Approach | | 405 | 2.0 | 0.325 | 5.9 | LOS A | 1.9 | 47.4 | 0.34 | 0.51 | 29.9 |
| West: Mulford Point Drive | | | | | | | | | | | |
| 5 | L | 520 | 2.0 | 0.566 | 9.8 | LOS A | 4.3 | 109.4 | 0.57 | 0.72 | 25.1 |
| 12 | R | 146 | 2.0 | 0.566 | 9.8 | LOS A | 4.3 | 109.4 | 0.57 | 0.60 | 26.9 |
| Approach | | 665 | 2.0 | 0.566 | 9.8 | LOS A | 4.3 | 109.4 | 0.57 | 0.69 | 25.5 |
| All Vehicles | | 1292 | 2.0 | 0.566 | 8.1 | LOS A | 4.3 | 109.4 | 0.50 | 0.66 | 27.0 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).






















Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
27: Teagarden St & Aladdin Ave

2035 PM + Project Mitigated

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  | |  |  | |  |  |  |
| Volume (vph) | 117 | 862 | 208 | 3 | 399 | 64 | 69 | 101 | 19 | 67 | 204 | 155 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 15 | 15 | 11 | 10 | 12 | 10 | 12 | 12 | 10 | 16 | 12 |
| Total Lost time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1711 | 1964 | | 1711 | 1675 | | 1652 | 1809 | | 1639 | 1777 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.20 | 1.00 | | 0.63 | 1.00 | |
| Satd. Flow (perm) | 1711 | 1964 | | 1711 | 1675 | | 347 | 1809 | | 1092 | 1777 | |
| 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) | 127 | 937 | 226 | 3 | 434 | 70 | 75 | 110 | 21 | 73 | 222 | 168 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 5 | 0 | 0 | 6 | 0 | 0 | 24 | 0 |
| Lane Group Flow (vph) | 127 | 1155 | 0 | 3 | 499 | 0 | 75 | 125 | 0 | 73 | 366 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 5 | 5 | | |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Bus Blockages (#/hr) | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | | 4 | |
| Actuated Green, G (s) | 13.2 | 64.6 | | 0.7 | 52.1 | | 27.5 | 27.5 | | 27.5 | 27.5 | |
| Effective Green, g (s) | 13.2 | 64.6 | | 0.7 | 52.1 | | 27.5 | 27.5 | | 27.5 | 27.5 | |
| Actuated g/C Ratio | 0.12 | 0.61 | | 0.01 | 0.49 | | 0.26 | 0.26 | | 0.26 | 0.26 | |
| Clearance Time (s) | 4.0 | 4.5 | | 4.0 | 4.5 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 213 | 1199 | | 11 | 824 | | 90 | 470 | | 283 | 461 | |
| v/s Ratio Prot | c0.07 | c0.59 | | 0.00 | 0.30 | | | 0.07 | | | 0.21 | |
| v/s Ratio Perm | | | | | | | c0.22 | | | 0.07 | | |
| v/c Ratio | 0.60 | 0.96 | | 0.27 | 0.61 | | 0.83 | 0.27 | | 0.26 | 0.79 | |
| Uniform Delay, d1 | 43.8 | 19.5 | | 52.3 | 19.4 | | 37.0 | 31.1 | | 31.1 | 36.5 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.2 | 17.9 | | 17.5 | 1.5 | | 46.9 | 0.4 | | 0.7 | 9.6 | |
| Delay (s) | 48.9 | 37.4 | | 69.8 | 20.9 | | 83.9 | 31.5 | | 31.7 | 46.1 | |
| Level of Service | D | D | | E | C | | F | C | | C | D | |
| Approach Delay (s) | | 38.5 | | | 21.2 | | | 50.6 | | | 43.8 | |
| Approach LOS | | D | | | C | | | D | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 37.0 | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | | | 0.93 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.8 | | | | | | | | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | | | 101.1% | | | | | | | | ICU Level of Service | G |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

2035 + Project Mitigated
Saturday

HCM Signalized Intersection Capacity Analysis
10: Aurora Drive & Marina Boulevard

2035+Project Mitigated

8/21/2014



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|------|-------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Volume (vph) | 24 | 400 | 14 | 23 | 602 | 18 | 19 | 18 | 39 | 14 | 18 | 24 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | | 1.00 | | | 1.00 | | | 0.93 | | | 0.94 | |
| Flt Protected | | 1.00 | | | 1.00 | | | 0.99 | | | 0.99 | |
| Satd. Flow (prot) | | 1850 | | | 1852 | | | 1714 | | | 1734 | |
| Flt Permitted | | 0.95 | | | 0.98 | | | 0.90 | | | 0.90 | |
| Satd. Flow (perm) | | 1764 | | | 1812 | | | 1563 | | | 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) | 26 | 435 | 15 | 25 | 654 | 20 | 21 | 20 | 42 | 15 | 20 | 26 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 34 | 0 | 0 | 21 | 0 |
| Lane Group Flow (vph) | 0 | 474 | 0 | 0 | 697 | 0 | 0 | 49 | 0 | 0 | 40 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 17.7 | | | 17.7 | | | 6.7 | | | 6.7 | |
| Effective Green, g (s) | | 17.7 | | | 17.7 | | | 6.7 | | | 6.7 | |
| Actuated g/C Ratio | | 0.53 | | | 0.53 | | | 0.20 | | | 0.20 | |
| Clearance Time (s) | | 4.5 | | | 4.5 | | | 4.5 | | | 4.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 934 | | | 960 | | | 313 | | | 317 | |
| v/s Ratio Prot | | | | | | | | | | | | |
| v/s Ratio Perm | | 0.27 | | | c0.38 | | | c0.03 | | | 0.03 | |
| v/c Ratio | | 0.51 | | | 0.73 | | | 0.16 | | | 0.13 | |
| Uniform Delay, d1 | | 5.0 | | | 6.0 | | | 11.0 | | | 11.0 | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 0.4 | | | 2.8 | | | 0.2 | | | 0.2 | |
| Delay (s) | | 5.5 | | | 8.8 | | | 11.3 | | | 11.1 | |
| Level of Service | | A | | | A | | | B | | | B | |
| Approach Delay (s) | | 5.5 | | | 8.8 | | | 11.3 | | | 11.1 | |
| Approach LOS | | A | | | A | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|-----|
| HCM 2000 Control Delay | 7.8 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.57 | | |
| Actuated Cycle Length (s) | 33.4 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 53.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

MOVEMENT SUMMARY

Site: 2035+Proj SAT

#10 Marina Boulevard & Aurora Road
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|------|----------------------|------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Aurora Road | | | | | | | | | | | |
| 3 | L | 21 | 2.0 | 0.095 | 5.1 | LOS A | 0.4 | 10.0 | 0.52 | 0.84 | 27.6 |
| 8 | T | 20 | 2.0 | 0.095 | 5.1 | LOS A | 0.4 | 10.0 | 0.52 | 0.62 | 30.5 |
| 18 | R | 42 | 2.0 | 0.095 | 5.1 | LOS A | 0.4 | 10.0 | 0.52 | 0.67 | 30.1 |
| Approach | | 83 | 2.0 | 0.095 | 5.1 | LOS A | 0.4 | 10.0 | 0.52 | 0.70 | 29.5 |
| East: Marina Boulevard | | | | | | | | | | | |
| 1 | L | 25 | 2.0 | 0.530 | 8.4 | LOS A | 4.3 | 108.9 | 0.34 | 0.81 | 26.0 |
| 6 | T | 654 | 2.0 | 0.530 | 8.4 | LOS A | 4.3 | 108.9 | 0.34 | 0.44 | 28.7 |
| 16 | R | 20 | 2.0 | 0.530 | 8.4 | LOS A | 4.3 | 108.9 | 0.34 | 0.52 | 28.2 |
| Approach | | 699 | 2.0 | 0.530 | 8.4 | LOS A | 4.3 | 108.9 | 0.34 | 0.46 | 28.5 |
| North: Aurora Road | | | | | | | | | | | |
| 7 | L | 15 | 2.0 | 0.088 | 6.1 | LOS A | 0.3 | 8.8 | 0.60 | 0.91 | 27.1 |
| 4 | T | 20 | 2.0 | 0.088 | 6.1 | LOS A | 0.3 | 8.8 | 0.60 | 0.72 | 29.7 |
| 14 | R | 26 | 2.0 | 0.088 | 6.1 | LOS A | 0.3 | 8.8 | 0.60 | 0.76 | 29.4 |
| Approach | | 61 | 2.0 | 0.088 | 6.1 | LOS A | 0.3 | 8.8 | 0.60 | 0.78 | 28.8 |
| West: Marina Boulevard | | | | | | | | | | | |
| 5 | L | 26 | 2.0 | 0.358 | 6.0 | LOS A | 2.2 | 56.7 | 0.25 | 0.85 | 27.0 |
| 2 | T | 435 | 2.0 | 0.358 | 6.0 | LOS A | 2.2 | 56.7 | 0.25 | 0.43 | 30.2 |
| 12 | R | 15 | 2.0 | 0.358 | 6.0 | LOS A | 2.2 | 56.7 | 0.25 | 0.52 | 29.6 |
| Approach | | 476 | 2.0 | 0.358 | 6.0 | LOS A | 2.2 | 56.7 | 0.25 | 0.46 | 30.0 |
| All Vehicles | | 1318 | 2.0 | 0.530 | 7.2 | LOS A | 4.3 | 108.9 | 0.33 | 0.49 | 29.1 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

HCM Signalized Intersection Capacity Analysis
 11: Doolittle Dr & Marina Blvd

2035+Project Mitigated
 8/21/2014



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 188 | 301 | 53 | 206 | 458 | 173 | 50 | 282 | 192 | 154 | 284 | 233 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 10 | 14 |
| Total Lost time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1652 | 3220 | | 1620 | 1739 | 1399 | 1652 | 3240 | 1332 | 1620 | 2859 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1652 | 3220 | | 1620 | 1739 | 1399 | 1652 | 3240 | 1332 | 1620 | 2859 | |
| 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) | 204 | 327 | 58 | 224 | 498 | 188 | 54 | 307 | 209 | 167 | 309 | 253 |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 0 | 97 | 0 | 0 | 171 | 0 | 117 | 0 |
| Lane Group Flow (vph) | 204 | 375 | 0 | 224 | 498 | 91 | 54 | 307 | 38 | 167 | 445 | 0 |
| Confl. Peds. (#/hr) | | | | | | 14 | | | 2 | | | 5 |
| Confl. Bikes (#/hr) | | | 7 | | | 5 | | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 2% | 4% | 2% | 4% | 4% | 4% | 4% | 2% |
| Parking (#/hr) | | | | | | | | | 0 | | 0 | 0 |
| Turn Type | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | 4 | | | 2 | | | |
| Actuated Green, G (s) | 18.0 | 24.6 | | 19.6 | 26.2 | 26.2 | 8.1 | 17.8 | 17.8 | 16.7 | 26.4 | |
| Effective Green, g (s) | 18.0 | 24.6 | | 19.6 | 26.2 | 26.2 | 8.1 | 17.8 | 17.8 | 16.7 | 26.4 | |
| Actuated g/C Ratio | 0.19 | 0.25 | | 0.20 | 0.27 | 0.27 | 0.08 | 0.18 | 0.18 | 0.17 | 0.27 | |
| Clearance Time (s) | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Grp Cap (vph) | 307 | 819 | | 328 | 471 | 379 | 138 | 596 | 245 | 279 | 780 | |
| v/s Ratio Prot | 0.12 | 0.12 | | c0.14 | c0.29 | | 0.03 | 0.09 | | c0.10 | c0.16 | |
| v/s Ratio Perm | | | | | | 0.07 | | | 0.03 | | | |
| v/c Ratio | 0.66 | 0.46 | | 0.68 | 1.06 | 0.24 | 0.39 | 0.52 | 0.16 | 0.60 | 0.57 | |
| Uniform Delay, d1 | 36.5 | 30.4 | | 35.7 | 35.2 | 27.5 | 42.0 | 35.6 | 33.1 | 36.9 | 30.3 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 5.9 | 0.6 | | 6.3 | 57.4 | 0.4 | 2.5 | 1.0 | 0.4 | 4.0 | 1.2 | |
| Delay (s) | 42.4 | 31.0 | | 41.9 | 92.7 | 27.9 | 44.5 | 36.6 | 33.6 | 40.9 | 31.5 | |
| Level of Service | D | C | | D | F | C | D | D | C | D | C | |
| Approach Delay (s) | | 34.9 | | | 66.8 | | | 36.2 | | | 33.6 | |
| Approach LOS | | C | | | E | | | D | | | C | |

| Intersection Summary | | |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 45.2 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.80 | D |
| Actuated Cycle Length (s) | 96.7 | Sum of lost time (s) |
| Intersection Capacity Utilization | 70.0% | 18.0 |
| Analysis Period (min) | 15 | ICU Level of Service |
| | | C |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 14: I-880 SB Ramps & Marina Blvd

2035+Project Mitigated
 8/21/2014



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|------|------|---------------------------|------|------|------|------|------|-------|
| Lane Configurations | | ↑↑ | ↑↑ | ↑↑ | ↑↑ | | | | ↑↑ | | | ↑↑ |
| Volume (vph) | 0 | 1251 | 633 | 476 | 989 | 0 | 0 | 0 | 501 | 0 | 0 | 1077 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 11 | 11 | 10 | 11 | 12 | 12 | 12 | 14 | 12 | 12 | 12 |
| Total Lost time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Lane Util. Factor | | 0.95 | 0.88 | 0.97 | 0.95 | | | | 0.88 | | | 0.88 |
| 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 | 0.85 | 1.00 | 1.00 | | | | 0.85 | | | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (prot) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | 1.00 | | | 1.00 |
| Satd. Flow (perm) | | 3355 | 2642 | 3143 | 3355 | | | | 2915 | | | 2787 |
| 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 | 1360 | 688 | 517 | 1075 | 0 | 0 | 0 | 545 | 0 | 0 | 1171 |
| RTOR Reduction (vph) | 0 | 0 | 205 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 |
| Lane Group Flow (vph) | 0 | 1360 | 483 | 517 | 1075 | 0 | 0 | 0 | 545 | 0 | 0 | 1109 |
| Confl. Peds. (#/hr) | | | | 4 | | | | | | | | |
| Heavy Vehicles (%) | 2% | 4% | 4% | 4% | 4% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Turn Type | | NA | Perm | Prot | NA | | | | Prot | | | Prot |
| Protected Phases | | 2 | | 4 | 6 | | | | 8 | | | 4 |
| Permitted Phases | | | 2 | | | | | | | | | |
| Actuated Green, G (s) | | 36.3 | 36.3 | 33.0 | 38.8 | | | | 33.0 | | | 33.0 |
| Effective Green, g (s) | | 36.3 | 36.3 | 33.0 | 38.8 | | | | 33.0 | | | 33.0 |
| Actuated g/C Ratio | | 0.46 | 0.46 | 0.42 | 0.50 | | | | 0.42 | | | 0.42 |
| Clearance Time (s) | | 4.5 | 4.5 | 4.5 | 2.0 | | | | 4.5 | | | 4.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | 3.0 | | | 3.0 |
| Lane Grp Cap (vph) | | 1555 | 1224 | 1324 | 1662 | | | | 1228 | | | 1174 |
| v/s Ratio Prot | | c0.41 | | 0.16 | 0.32 | | | | 0.19 | | | c0.40 |
| v/s Ratio Perm | | | 0.18 | | | | | | | | | |
| v/c Ratio | | 0.87 | 0.39 | 0.39 | 0.65 | | | | 0.44 | | | 0.94 |
| Uniform Delay, d1 | | 18.9 | 13.8 | 15.7 | 14.7 | | | | 16.1 | | | 21.8 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | | | 1.00 |
| Incremental Delay, d2 | | 5.8 | 0.2 | 0.2 | 0.9 | | | | 0.3 | | | 14.8 |
| Delay (s) | | 24.7 | 14.0 | 15.9 | 15.5 | | | | 16.4 | | | 36.5 |
| Level of Service | | C | B | B | B | | | | B | | | D |
| Approach Delay (s) | | 21.1 | | | 15.6 | | | 16.4 | | | 36.5 | |
| Approach LOS | | C | | | B | | | B | | | D | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 22.4 | | | HCM 2000 Level of Service | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.91 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 78.3 | | | Sum of lost time (s) | | | 9.0 | | | |
| Intersection Capacity Utilization | | | 72.1% | | | ICU Level of Service | | | C | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Appendix 6 Freeway Level of Service
Worksheets

I-880 from Marina to Davis NB
AM

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2013 | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6101 | 0.95 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6711 |
| V_{RF} | 907 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 964 |
| V_{FR} | 641 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 681 |
| V_{RR} | 0 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6711 | | | | | | | V = | 8356 |
| V_W | 1645 | | | | | | | | |
| VR | 0.197 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1645 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2358 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1754 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4112 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1385 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8356 pc/h | | | | Weaving intensity factor, W | 0.389 | | | |
| Weaving segment capacity, c_w | 10349 veh/h | | | | Weaving segment speed, S | 46.2 mph | | | |
| Weaving segment v/c ratio | 0.773 | | | | Average weaving speed, S_W | 51.0 mph | | | |
| Weaving segment density, D | 36.2 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 45.1 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4504 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | Baseline AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6100 | 0.95 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6710 |
| V_{RF} | 948 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1008 |
| V_{FR} | 641 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 681 |
| V_{RR} | 0 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6710 | | | | | | | V = | 8399 |
| V_W | 1689 | | | | | | | | |
| VR | 0.201 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1689 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2402 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1753 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4155 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1385 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8399 pc/h | | | | Weaving intensity factor, W | 0.393 | | | |
| Weaving segment capacity, c_w | 10335 veh/h | | | | Weaving segment speed, S | 45.9 mph | | | |
| Weaving segment v/c ratio | 0.778 | | | | Average weaving speed, S_W | 50.9 mph | | | |
| Weaving segment density, D | 36.6 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 44.8 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4547 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | Baseline + Project AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6100 | 0.95 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6710 |
| V_{RF} | 957 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1017 |
| V_{FR} | 641 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 681 |
| V_{RR} | 0 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6710 | | | | | | | V = | 8408 |
| V_W | 1698 | | | | | | | | |
| VR | 0.202 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1698 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2411 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1753 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4164 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1385 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8408 pc/h | | | | Weaving intensity factor, W | 0.393 | | | |
| Weaving segment capacity, c_w | 10330 veh/h | | | | Weaving segment speed, S | 45.8 mph | | | |
| Weaving segment v/c ratio | 0.779 | | | | Average weaving speed, S_W | 50.9 mph | | | |
| Weaving segment density, D | 36.7 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 44.7 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4556 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2020 AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6468 | 0.95 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 7115 |
| V_{RF} | 877 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 932 |
| V_{FR} | 699 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 743 |
| V_{RR} | 0 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 7115 | | | | | | | V = | 8790 |
| V_W | 1675 | | | | | | | | |
| VR | 0.191 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1675 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2388 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 2050 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4438 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1469 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8790 pc/h | | | | Weaving intensity factor, W | 0.413 | | | |
| Weaving segment capacity, c_w | 10373 veh/h | | | | Weaving segment speed, S | 45.5 mph | | | |
| Weaving segment v/c ratio | 0.811 | | | | Average weaving speed, S_W | 50.4 mph | | | |
| Weaving segment density, D | 38.6 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 44.5 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4440 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2020 + Project AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6468 | 0.95 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 7115 |
| V_{RF} | 883 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 939 |
| V_{FR} | 699 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 743 |
| V_{RR} | 0 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 7115 | | | | | | | V = | 8797 |
| V_W | 1682 | | | | | | | | |
| VR | 0.191 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1682 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2395 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 2050 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4445 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1469 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8797 pc/h | | | | Weaving intensity factor, W | 0.414 | | | |
| Weaving segment capacity, c_w | 10373 veh/h | | | | Weaving segment speed, S | 45.5 mph | | | |
| Weaving segment v/c ratio | 0.812 | | | | Average weaving speed, S_W | 50.4 mph | | | |
| Weaving segment density, D | 38.7 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 44.4 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4446 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2035 AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6128 | 0.95 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6741 |
| V_{RF} | 1000 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1063 |
| V_{FR} | 690 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 734 |
| V_{RR} | 0 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6741 | | | | | | | V = | 8538 |
| V_W | 1797 | | | | | | | | |
| VR | 0.210 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1797 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2510 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1776 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4286 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1391 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8538 pc/h | | | | Weaving intensity factor, W | 0.402 | | | |
| Weaving segment capacity, c_w | 10301 veh/h | | | | Weaving segment speed, S | 45.1 mph | | | |
| Weaving segment v/c ratio | 0.793 | | | | Average weaving speed, S_W | 50.7 mph | | | |
| Weaving segment density, D | 37.8 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 43.9 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4644 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2035 + Project AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6128 | 0.95 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6741 |
| V_{RF} | 1008 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1072 |
| V_{FR} | 690 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 734 |
| V_{RR} | 0 | 0.95 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6741 | | | | | | | V = | 8547 |
| V_W | 1806 | | | | | | | | |
| VR | 0.211 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1806 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2519 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1776 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4295 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1391 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8547 pc/h | | | | Weaving intensity factor, W | 0.403 | | | |
| Weaving segment capacity, c_w | 10297 veh/h | | | | Weaving segment speed, S | 45.1 mph | | | |
| Weaving segment v/c ratio | 0.794 | | | | Average weaving speed, S_W | 50.6 mph | | | |
| Weaving segment density, D | 37.9 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 43.8 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4652 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

I-880 from Marina to Davis NB
PM

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2013 | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 5095 | 0.98 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5433 |
| V_{RF} | 974 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1004 |
| V_{FR} | 960 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 989 |
| V_{RR} | 0 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5433 | | | | | | | V = | 7426 |
| V_W | 1993 | | | | | | | | |
| VR | 0.268 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1993 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2706 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1275 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 3981 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1121 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 7426 pc/h | | | | Weaving intensity factor, W | 0.379 | | | |
| Weaving segment capacity, c_w | 8557 veh/h | | | | Weaving segment speed, S | 45.4 mph | | | |
| Weaving segment v/c ratio | 0.830 | | | | Average weaving speed, S_W | 51.2 mph | | | |
| Weaving segment density, D | 32.7 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 43.5 mph | | | |
| Level of Service, LOS | D | | | | Maximum weaving length, L_{MAX} | 5247 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | Baseline PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 5094 | 0.98 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5432 |
| V_{RF} | 1186 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1222 |
| V_{FR} | 961 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 990 |
| V_{RR} | 0 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5432 | | | | | | | V = | 7644 |
| V_W | 2212 | | | | | | | | |
| VR | 0.289 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 2212 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2925 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1275 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4200 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1121 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 7644 pc/h | | | | Weaving intensity factor, W | 0.396 | | | |
| Weaving segment capacity, c_w | 7937 veh/h | | | | Weaving segment speed, S | 44.0 mph | | | |
| Weaving segment v/c ratio | 0.922 | | | | Average weaving speed, S_W | 50.8 mph | | | |
| Weaving segment density, D | 34.7 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 41.7 mph | | | |
| Level of Service, LOS | D | | | | Maximum weaving length, L_{MAX} | 5470 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | Baseline + Project PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 5094 | 0.98 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5432 |
| V_{RF} | 1198 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1235 |
| V_{FR} | 961 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 990 |
| V_{RR} | 0 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5432 | | | | | | | V = | 7657 |
| V_W | 2225 | | | | | | | | |
| VR | 0.291 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 2225 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2938 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1275 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4213 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1121 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 7657 pc/h | | | | Weaving intensity factor, W | 0.397 | | | |
| Weaving segment capacity, c_w | 7904 veh/h | | | | Weaving segment speed, S | 43.9 mph | | | |
| Weaving segment v/c ratio | 0.927 | | | | Average weaving speed, S_W | 50.8 mph | | | |
| Weaving segment density, D | 34.9 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 41.6 mph | | | |
| Level of Service, LOS | D | | | | Maximum weaving length, L_{MAX} | 5483 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2020 PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 5833 | 0.98 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6220 |
| V_{RF} | 1049 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1081 |
| V_{FR} | 925 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 953 |
| V_{RR} | 0 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6220 | | | | | | | V = | 8254 |
| V_W | 2034 | | | | | | | | |
| VR | 0.246 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 2034 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2747 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1437 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4184 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1284 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8254 pc/h | | | | Weaving intensity factor, W | 0.395 | | | |
| Weaving segment capacity, c_w | 9320 veh/h | | | | Weaving segment speed, S | 44.2 mph | | | |
| Weaving segment v/c ratio | 0.847 | | | | Average weaving speed, S_W | 50.9 mph | | | |
| Weaving segment density, D | 37.3 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 42.4 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 5016 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2020 + Project PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 5833 | 0.98 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6220 |
| V_{RF} | 1086 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1119 |
| V_{FR} | 925 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 953 |
| V_{RR} | 0 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6220 | | | | | | | V = | 8292 |
| V_W | 2072 | | | | | | | | |
| VR | 0.250 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 2072 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2785 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1437 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4222 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1284 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8292 pc/h | | | | Weaving intensity factor, W | 0.397 | | | |
| Weaving segment capacity, c_w | 9191 veh/h | | | | Weaving segment speed, S | 44.0 mph | | | |
| Weaving segment v/c ratio | 0.863 | | | | Average weaving speed, S_W | 50.8 mph | | | |
| Weaving segment density, D | 37.7 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 42.1 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 5052 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2035 PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6231 | 0.98 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6644 |
| V_{RF} | 1200 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1237 |
| V_{FR} | 898 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 925 |
| V_{RR} | 0 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6644 | | | | | | | V = | 8806 |
| V_W | 2162 | | | | | | | | |
| VR | 0.246 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 2162 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2875 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1705 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4580 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1371 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8806 pc/h | | | | Weaving intensity factor, W | 0.424 | | | |
| Weaving segment capacity, c_w | 9354 veh/h | | | | Weaving segment speed, S | 42.9 mph | | | |
| Weaving segment v/c ratio | 0.901 | | | | Average weaving speed, S_W | 50.1 mph | | | |
| Weaving segment density, D | 41.1 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 41.0 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 5007 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 NB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2035 + Project PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2064ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6231 | 0.98 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6644 |
| V_{RF} | 1245 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1283 |
| V_{FR} | 898 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 925 |
| V_{RR} | 0 | 0.98 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6644 | | | | | | | V = | 8852 |
| V_W | 2208 | | | | | | | | |
| VR | 0.249 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 2208 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2921 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1705 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4626 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1371 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8852 pc/h | | | | Weaving intensity factor, W | 0.427 | | | |
| Weaving segment capacity, c_w | 9207 veh/h | | | | Weaving segment speed, S | 42.6 mph | | | |
| Weaving segment v/c ratio | 0.920 | | | | Average weaving speed, S_W | 50.0 mph | | | |
| Weaving segment density, D | 41.6 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 40.6 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 5048 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

I-880 from Marina to Davis SB
AM

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2013 | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 4935 | 0.96 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5372 |
| V_{RF} | 704 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 741 |
| V_{FR} | 448 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 471 |
| V_{RR} | 0 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5372 | | | | | | | V = | 6584 |
| V_W | 1212 | | | | | | | | |
| VR | 0.184 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1212 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 1995 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1469 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 3464 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1304 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 6584 pc/h | | | | Weaving intensity factor, W | 0.299 | | | |
| Weaving segment capacity, c_w | 10531 veh/h | | | | Weaving segment speed, S | 50.6 mph | | | |
| Weaving segment v/c ratio | 0.598 | | | | Average weaving speed, S_W | 53.5 mph | | | |
| Weaving segment density, D | 26.0 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 50.0 mph | | | |
| Level of Service, LOS | C | | | | Maximum weaving length, L_{MAX} | 4374 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | Baseline AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 4934 | 0.96 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5371 |
| V_{RF} | 736 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 774 |
| V_{FR} | 448 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 471 |
| V_{RR} | 0 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5371 | | | | | | | V = | 6616 |
| V_W | 1245 | | | | | | | | |
| VR | 0.188 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1245 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2028 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1468 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 3496 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1304 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 6616 pc/h | | | | Weaving intensity factor, W | 0.301 | | | |
| Weaving segment capacity, c_w | 10517 veh/h | | | | Weaving segment speed, S | 50.3 mph | | | |
| Weaving segment v/c ratio | 0.602 | | | | Average weaving speed, S_W | 53.4 mph | | | |
| Weaving segment density, D | 26.3 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 49.7 mph | | | |
| Level of Service, LOS | C | | | | Maximum weaving length, L_{MAX} | 4416 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | Baseline + Project AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 4934 | 0.96 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5371 |
| V_{RF} | 745 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 784 |
| V_{FR} | 448 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 471 |
| V_{RR} | 0 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5371 | | | | | | | V = | 6626 |
| V_W | 1255 | | | | | | | | |
| VR | 0.189 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1255 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2038 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1468 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 3506 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1304 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 6626 pc/h | | | | Weaving intensity factor, W | 0.302 | | | |
| Weaving segment capacity, c_w | 10512 veh/h | | | | Weaving segment speed, S | 50.3 mph | | | |
| Weaving segment v/c ratio | 0.603 | | | | Average weaving speed, S_W | 53.4 mph | | | |
| Weaving segment density, D | 26.4 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 49.6 mph | | | |
| Level of Service, LOS | C | | | | Maximum weaving length, L_{MAX} | 4428 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2020 AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 5232 | 0.96 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5695 |
| V_{RF} | 681 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 716 |
| V_{FR} | 405 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 426 |
| V_{RR} | 0 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5695 | | | | | | | V = | 6837 |
| V_W | 1142 | | | | | | | | |
| VR | 0.167 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1142 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 1925 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1709 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 3634 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1383 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 6837 pc/h | | | | Weaving intensity factor, W | 0.311 | | | |
| Weaving segment capacity, c_w | 10593 veh/h | | | | Weaving segment speed, S | 50.7 mph | | | |
| Weaving segment v/c ratio | 0.618 | | | | Average weaving speed, S_W | 53.1 mph | | | |
| Weaving segment density, D | 27.0 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 50.2 mph | | | |
| Level of Service, LOS | C | | | | Maximum weaving length, L_{MAX} | 4202 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2020 + Project AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 5232 | 0.96 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5695 |
| V_{RF} | 687 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 723 |
| V_{FR} | 405 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 426 |
| V_{RR} | 0 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5695 | | | | | | | V = | 6844 |
| V_W | 1149 | | | | | | | | |
| VR | 0.168 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1149 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 1932 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1709 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 3641 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1383 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 6844 pc/h | | | | Weaving intensity factor, W | 0.311 | | | |
| Weaving segment capacity, c_w | 10593 veh/h | | | | Weaving segment speed, S | 50.6 mph | | | |
| Weaving segment v/c ratio | 0.618 | | | | Average weaving speed, S_W | 53.1 mph | | | |
| Weaving segment density, D | 27.0 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 50.2 mph | | | |
| Level of Service, LOS | C | | | | Maximum weaving length, L_{MAX} | 4210 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2035 AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 4957 | 0.96 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5396 |
| V_{RF} | 776 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 816 |
| V_{FR} | 482 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 507 |
| V_{RR} | 0 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5396 | | | | | | | V = | 6719 |
| V_W | 1323 | | | | | | | | |
| VR | 0.197 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1323 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2106 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1487 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 3593 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1310 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 6719 pc/h | | | | Weaving intensity factor, W | 0.308 | | | |
| Weaving segment capacity, c_w | 10483 veh/h | | | | Weaving segment speed, S | 49.8 mph | | | |
| Weaving segment v/c ratio | 0.613 | | | | Average weaving speed, S_W | 53.2 mph | | | |
| Weaving segment density, D | 27.0 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 49.0 mph | | | |
| Level of Service, LOS | C | | | | Maximum weaving length, L_{MAX} | 4505 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2035 + Project AM | | | |
| Analysis Time Period | AM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 4957 | 0.96 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 5396 |
| V_{RF} | 784 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 825 |
| V_{FR} | 482 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 507 |
| V_{RR} | 0 | 0.96 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 5396 | | | | | | | V = | 6728 |
| V_W | 1332 | | | | | | | | |
| VR | 0.198 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1332 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2115 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 1487 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 3602 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1310 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 6728 pc/h | | | | Weaving intensity factor, W | 0.309 | | | |
| Weaving segment capacity, c_w | 10478 veh/h | | | | Weaving segment speed, S | 49.7 mph | | | |
| Weaving segment v/c ratio | 0.614 | | | | Average weaving speed, S_W | 53.2 mph | | | |
| Weaving segment density, D | 27.1 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 49.0 mph | | | |
| Level of Service, LOS | C | | | | Maximum weaving length, L_{MAX} | 4516 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

I-880 from Marina to Davis SB
PM

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2013 | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 5898 | 0.99 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6226 |
| V_{RF} | 1035 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1056 |
| V_{FR} | 421 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 430 |
| V_{RR} | 0 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 6226 | | | | | | | V = | 7712 |
| V_W | 1486 | | | | | | | | |
| VR | 0.193 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1486 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2269 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 2105 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 4374 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1512 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 7712 pc/h | | | | Weaving intensity factor, W | 0.360 | | | |
| Weaving segment capacity, c_w | 10498 veh/h | | | | Weaving segment speed, S | 47.8 mph | | | |
| Weaving segment v/c ratio | 0.703 | | | | Average weaving speed, S_W | 51.8 mph | | | |
| Weaving segment density, D | 32.3 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 46.9 mph | | | |
| Level of Service, LOS | D | | | | Maximum weaving length, L_{MAX} | 4462 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|---|-----------------|-----------------|----------------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | Baseline PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S _{MIN} | 15 | | | |
| Weaving segment length, L _S | 2428ft | | | | Freeway maximum capacity, C _{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E _T | E _R | f _{HV} | f _p | v (pc/h) |
| V _{FF} | 5897 | 0.99 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6225 |
| V _{RF} | 1261 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1286 |
| V _{FR} | 421 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 430 |
| V _{RR} | 0 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V _{NW} | 6225 | | | | | | | V = | 7941 |
| V _W | 1716 | | | | | | | | |
| VR | 0.216 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N _{WL} | 2 lc | | | | Minimum weaving lane changes, LC _{MIN} | 1716 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC _W | 2499 lc/h | | | |
| Minimum RF lane changes, LC _{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC _{NW} | 2104 lc/h | | | |
| Minimum FR lane changes, LC _{FR} | 1 lc/pc | | | | Total lane changes, LC _{ALL} | 4603 lc/h | | | |
| Minimum RR lane changes, LC _{RR} | lc/pc | | | | Non-weaving vehicle index, I _{NW} | 1511 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 7941 pc/h | | | | Weaving intensity factor, W | 0.374 | | | |
| Weaving segment capacity, c _w | 10411 veh/h | | | | Weaving segment speed, S | 46.3 mph | | | |
| Weaving segment v/c ratio | 0.730 | | | | Average weaving speed, S _w | 51.4 mph | | | |
| Weaving segment density, D | 34.3 pc/mi/ln | | | | Average non-weaving speed, S _{NW} | 45.0 mph | | | |
| Level of Service, LOS | D | | | | Maximum weaving length, L _{MAX} | 4701 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|---|-----------------------|-----------------|----------------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | Baseline + Project PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S _{MIN} | 15 | | | |
| Weaving segment length, L _S | 2428ft | | | | Freeway maximum capacity, C _{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E _T | E _R | f _{HV} | f _p | v (pc/h) |
| V _{FF} | 5897 | 0.99 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 6225 |
| V _{RF} | 1273 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1299 |
| V _{FR} | 421 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 430 |
| V _{RR} | 0 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V _{NW} | 6225 | | | | | | | V = | 7954 |
| V _W | 1729 | | | | | | | | |
| VR | 0.217 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N _{WL} | 2 lc | | | | Minimum weaving lane changes, LC _{MIN} | 1729 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC _W | 2512 lc/h | | | |
| Minimum RF lane changes, LC _{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC _{NW} | 2104 lc/h | | | |
| Minimum FR lane changes, LC _{FR} | 1 lc/pc | | | | Total lane changes, LC _{ALL} | 4616 lc/h | | | |
| Minimum RR lane changes, LC _{RR} | lc/pc | | | | Non-weaving vehicle index, I _{NW} | 1511 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 7954 pc/h | | | | Weaving intensity factor, W | 0.375 | | | |
| Weaving segment capacity, c _w | 10407 veh/h | | | | Weaving segment speed, S | 46.2 mph | | | |
| Weaving segment v/c ratio | 0.731 | | | | Average weaving speed, S _w | 51.4 mph | | | |
| Weaving segment density, D | 34.5 pc/mi/ln | | | | Average non-weaving speed, S _{NW} | 44.9 mph | | | |
| Level of Service, LOS | D | | | | Maximum weaving length, L _{MAX} | 4715 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2020 PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6752 | 0.99 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 7127 |
| V_{RF} | 1195 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1219 |
| V_{FR} | 406 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 414 |
| V_{RR} | 0 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 7127 | | | | | | | V = | 8760 |
| V_W | 1633 | | | | | | | | |
| VR | 0.186 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1633 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2416 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 2786 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 5202 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1730 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8760 pc/h | | | | Weaving intensity factor, W | 0.412 | | | |
| Weaving segment capacity, c_w | 10522 veh/h | | | | Weaving segment speed, S | 45.8 mph | | | |
| Weaving segment v/c ratio | 0.797 | | | | Average weaving speed, S_W | 50.4 mph | | | |
| Weaving segment density, D | 38.3 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 44.8 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4398 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2020 + Project PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 6752 | 0.99 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 7127 |
| V_{RF} | 1232 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1257 |
| V_{FR} | 406 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 414 |
| V_{RR} | 0 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 7127 | | | | | | | V = | 8798 |
| V_W | 1671 | | | | | | | | |
| VR | 0.190 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1671 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2454 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 2786 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 5240 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1730 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 8798 pc/h | | | | Weaving intensity factor, W | 0.415 | | | |
| Weaving segment capacity, c_w | 10512 veh/h | | | | Weaving segment speed, S | 45.5 mph | | | |
| Weaving segment v/c ratio | 0.801 | | | | Average weaving speed, S_W | 50.3 mph | | | |
| Weaving segment density, D | 38.7 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 44.5 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4433 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-----------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2035 PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 7213 | 0.99 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 7614 |
| V_{RF} | 1275 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1301 |
| V_{FR} | 394 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 402 |
| V_{RR} | 0 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 7614 | | | | | | | V = | 9317 |
| V_W | 1703 | | | | | | | | |
| VR | 0.183 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1703 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2486 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 3158 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 5644 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1849 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 9317 pc/h | | | | Weaving intensity factor, W | 0.440 | | | |
| Weaving segment capacity, c_w | 10536 veh/h | | | | Weaving segment speed, S | 44.8 mph | | | |
| Weaving segment v/c ratio | 0.846 | | | | Average weaving speed, S_W | 49.7 mph | | | |
| Weaving segment density, D | 41.6 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 43.8 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4361 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

| FREEWAY WEAVING WORKSHEET | | | | | | | | | |
|---|------------------------------|------|-----------|--------|--|-------------------|----------|-------|----------|
| General Information | | | | | Site Information | | | | |
| Analyst | Aaron Elias | | | | Freeway/Dir of Travel | I-880 SB | | | |
| Agency/Company | Kittelson & Associates, Inc. | | | | Weaving Segment Location | Marina to Davis | | | |
| Date Performed | 3/15/2014 | | | | Analysis Year | 2035 + Project PM | | | |
| Analysis Time Period | PM Peak Hour | | | | | | | | |
| Project Description | | | | | | | | | |
| Inputs | | | | | | | | | |
| Weaving configuration | One-Sided | | | | Segment type | Freeway | | | |
| Weaving number of lanes, N | 5 | | | | Freeway minimum speed, S_{MIN} | 15 | | | |
| Weaving segment length, L_S | 2428ft | | | | Freeway maximum capacity, C_{IFL} | 2350 | | | |
| Freeway free-flow speed, FFS | 65 mph | | | | Terrain type | Level | | | |
| Conversions to pc/h Under Base Conditions | | | | | | | | | |
| | V (veh/h) | PHF | Truck (%) | RV (%) | E_T | E_R | f_{HV} | f_p | v (pc/h) |
| V_{FF} | 7213 | 0.99 | 9 | 0 | 1.5 | 1.2 | 0.957 | 1.00 | 7614 |
| V_{RF} | 1320 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 1347 |
| V_{FR} | 394 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 402 |
| V_{RR} | 0 | 0.99 | 2 | 0 | 1.5 | 1.2 | 0.990 | 1.00 | 0 |
| V_{NW} | 7614 | | | | | | | V = | 9363 |
| V_W | 1749 | | | | | | | | |
| VR | 0.187 | | | | | | | | |
| Configuration Characteristics | | | | | | | | | |
| Minimum maneuver lanes, N_{WL} | 2 lc | | | | Minimum weaving lane changes, LC_{MIN} | 1749 lc/h | | | |
| Interchange density, ID | 1.0 int/mi | | | | Weaving lane changes, LC_W | 2532 lc/h | | | |
| Minimum RF lane changes, LC_{RF} | 1 lc/pc | | | | Non-weaving lane changes, LC_{NW} | 3158 lc/h | | | |
| Minimum FR lane changes, LC_{FR} | 1 lc/pc | | | | Total lane changes, LC_{ALL} | 5690 lc/h | | | |
| Minimum RR lane changes, LC_{RR} | lc/pc | | | | Non-weaving vehicle index, I_{NW} | 1849 | | | |
| Weaving Segment Speed, Density, Level of Service, and Capacity | | | | | | | | | |
| Weaving segment flow rate, v | 9363 pc/h | | | | Weaving intensity factor, W | 0.443 | | | |
| Weaving segment capacity, c_w | 10522 veh/h | | | | Weaving segment speed, S | 44.5 mph | | | |
| Weaving segment v/c ratio | 0.852 | | | | Average weaving speed, S_W | 49.7 mph | | | |
| Weaving segment density, D | 42.1 pc/mi/ln | | | | Average non-weaving speed, S_{NW} | 43.4 mph | | | |
| Level of Service, LOS | E | | | | Maximum weaving length, L_{MAX} | 4402 ft | | | |
| Notes | | | | | | | | | |
| a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments". | | | | | | | | | |
| b. For volumes that exceed the weaving segment capacity, the level of service is "F". | | | | | | | | | |

I-880 North of Davis NB AM

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|--|------------------------------|----------|---|--------------------------------|-----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel | I-880 NB | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To | N/O Davis | |
| Date Performed | 3/14/2014 | | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | | Analysis Year | 2020 AM | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 6526 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 4 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | mph | FFS | 65.0 | mph |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| <u>Operational (LOS)</u> | | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | 1814 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln | |
| S | 62.6 | mph | S | mph | |
| D = v _p / S | 29.0 | pc/mi/ln | D = v _p / S | pc/mi/ln | |
| LOS | D | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service speed | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|---|------------------------------|---------|---|--------------------------------|--|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel | I-880 NB | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To | N/O Davis | |
| Date Performed | 3/14/2014 | | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | | Analysis Year | 2020 + Project AM | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 6572 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | ft | | | | |
| Rt-Side Lat. Clearance | ft | | f _{LW} | mph | |
| Number of Lanes, N | 4 | | f _{LC} | mph | |
| Total Ramp Density, TRD | ramps/mi | | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | | FFS | 65.0 | |
| Base free-flow Speed, BFFS | mph | | | | |
| LOS and Performance Measures | | | Design (N) | | |
| <u>Operational (LOS)</u> | | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | 1827 | | Design LOS | | |
| x f _p) | | | v _p = (V or DDHV) / (PHF x N x f _{HV}) | pc/h/ln | |
| S | 62.4 | | x f _p) | | |
| D = v _p / S | 29.3 | | S | mph | |
| LOS | D | | D = v _p / S | pc/mi/ln | |
| | | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|--|---|---|--|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 NB</i> |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>N/O Davis</i> |
| Date Performed | <i>3/14/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>AM Peak Hour</i> | Analysis Year | <i>2035 AM</i> |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | <i>6389</i> | veh/h | Peak-Hour Factor, PHF <i>0.94</i> |
| AADT | | veh/day | %Trucks and Buses, P _T <i>9</i> |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R <i>0</i> |
| Peak-Hr Direction Prop, D | | | General Terrain: <i>Level</i> |
| DDHV = AADT x K x D | | veh/h | Grade % Length <i>mi</i> |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | |
| Number of Lanes, N | <i>4</i> | | f _{LW} mph |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} mph |
| FFS (measured) | <i>65.0</i> | mph | TRD Adjustment mph |
| Base free-flow Speed, BFFS | | mph | FFS <i>65.0</i> mph |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1776</i> | pc/h/ln | Design LOS |
| S | <i>63.0</i> | mph | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) |
| D = v _p / S | <i>28.2</i> | pc/mi/ln | S |
| LOS | <i>D</i> | | D = v _p / S |
| | | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|--|------------------------------|----------|---|--------------------------------|-----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel | I-880 NB | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To | N/O Davis | |
| Date Performed | 3/14/2014 | | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | | Analysis Year | 2035 + Project AM | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 6442 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 4 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | mph | FFS | 65.0 | mph |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| <u>Operational (LOS)</u> | | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | 1790 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln | |
| S | 62.8 | mph | S | mph | |
| D = v _p / S | 28.5 | pc/mi/ln | D = v _p / S | pc/mi/ln | |
| LOS | D | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service speed | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

I-880 North of Davis NB PM

I-880 North of Davis SB AM

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|---|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 SB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | N/O Davis |
| Date Performed | 3/14/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | 2013 |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 5619 | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | %Trucks and Buses, P _T |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R |
| Peak-Hr Direction Prop, D | | | General Terrain: |
| DDHV = AADT x K x D | | veh/h | Grade % Length |
| | | | Up/Down % |
| | | | mi |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | |
| Number of Lanes, N | 4 | | f _{LW} |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} |
| FFS (measured) | 65.0 | mph | TRD Adjustment |
| Base free-flow Speed, BFFS | | mph | FFS |
| | | | 65.0 |
| | | | mph |
| LOS and Performance Measures | | Design (N) | |
| Operational (LOS) | | Design (N) | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | Design LOS | |
| | 1562 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) |
| | | | x f _p) |
| S | 64.6 | mph | S |
| D = v _p / S | 24.2 | pc/mi/ln | D = v _p / S |
| LOS | C | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|---|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 SB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | N/O Davis |
| Date Performed | 3/14/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Baseline AM |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 5810 | veh/h | Peak-Hour Factor, PHF 0.94 |
| AADT | | veh/day | %Trucks and Buses, P _T 9 |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R 0 |
| Peak-Hr Direction Prop, D | | | General Terrain: Level |
| DDHV = AADT x K x D | | veh/h | Grade % Length mi Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | |
| Number of Lanes, N | 4 | | f _{LW} mph |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} mph |
| FFS (measured) | 65.0 | mph | TRD Adjustment mph |
| Base free-flow Speed, BFFS | | mph | FFS 65.0 mph |
| LOS and Performance Measures | | Design (N) | |
| Operational (LOS) | | Design (N) | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | Design LOS | |
| | 1615 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) |
| x f _p) | | | x f _p) |
| S | 64.3 | mph | S |
| D = v _p / S | 25.1 | pc/mi/ln | D = v _p / S |
| LOS | C | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|--|------------------------------|---------|---|---------------|----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel I-880 SB | | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To N/O Davis | | |
| Date Performed | 3/14/2014 | | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | | Analysis Year 2020 + Project AM | | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 7130 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: Level | | |
| DDHV = AADT x K x D | | veh/h | Grade % | Length | mi |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.957 | | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | ft | | | | |
| Rt-Side Lat. Clearance | ft | | | | |
| Number of Lanes, N | 5 | | | | |
| Total Ramp Density, TRD | ramps/mi | | | | |
| FFS (measured) | 65.0 mph | | | | |
| Base free-flow Speed, BFFS | mph | | | | |
| | | | f _{LW} | mph | |
| | | | f _{LC} | mph | |
| | | | TRD Adjustment | | |
| | | | FFS | | |
| | | | 65.0 mph | | |
| LOS and Performance Measures | | | Design (N) | | |
| <u>Operational (LOS)</u> | | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | | | Design LOS | | |
| 1585 | pc/h/ln | | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | | |
| S | 64.5 mph | | S | | |
| D = v _p / S | 24.6 pc/mi/ln | | D = v _p / S | | |
| LOS | C | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | | |
| V - Hourly volume | D - Density | | f _{LW} - Exhibit 11-8 | | |
| v _p - Flow rate | FFS - Free-flow speed | | E _T - Exhibits 11-10, 11-11, 11-13 | | |
| LOS - Level of service | BFFS - Base free-flow speed | | f _{LC} - Exhibit 11-9 | | |
| DDHV - Directional design hour volume | | | f _p - Page 11-18 | | |
| | | | TRD - Page 11-11 | | |
| | | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|--|------------------------------|----------|---|--------------------------------|-----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel | I-880 SB | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To | N/O Davis | |
| Date Performed | 3/14/2014 | | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | | Analysis Year | 2035 AM | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 7712 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 5 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | mph | FFS | 65.0 | mph |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| <u>Operational (LOS)</u> | | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | 1715 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln | |
| S | 63.6 | mph | S | mph | |
| D = v _p / S | 27.0 | pc/mi/ln | D = v _p / S | pc/mi/ln | |
| LOS | D | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

I-880 North of Davis SB PM

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|--|---|---|-----------------------------------|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 SB</i> |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>N/O Davis</i> |
| Date Performed | <i>3/14/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>2013</i> |
| Project Description | | | |
| Oper.(LOS) | Des.(N) | Planning Data | |
| Flow Inputs | | | |
| Volume, V | <i>6340</i> | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | <i>0.94</i> |
| Peak-Hr Prop. of AADT, K | | | %Trucks and Buses, P _T |
| Peak-Hr Direction Prop, D | | | <i>9</i> |
| DDHV = AADT x K x D | veh/h | | %RVs, P _R |
| | | | <i>0</i> |
| | | | General Terrain: |
| | | | <i>Level</i> |
| | | | Grade % Length |
| | | | <i>mi</i> |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | <i>4</i> | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | FFS | <i>65.0</i> |
| Base free-flow Speed, BFFS | mph | | mph |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | | Design LOS | |
| <i>1762</i> | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | |
| S | <i>63.1</i> | mph | pc/h/ln |
| D = v _p / S | <i>27.9</i> | S | mph |
| LOS | <i>D</i> | D = v _p / S | pc/mi/ln |
| | | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|-----------------------------------|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 SB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | N/O Davis |
| Date Performed | 3/14/2014 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Baseline PM |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 6418 | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | %Trucks and Buses, P _T |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R |
| Peak-Hr Direction Prop, D | | | General Terrain: |
| DDHV = AADT x K x D | | veh/h | Grade % Length |
| | | | Up/Down % |
| | | | mi |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | 4 | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | 65.0 | FFS | 65.0 |
| Base free-flow Speed, BFFS | mph | | mph |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | 1784 | Design LOS | |
| x f _p) | | v _p = (V or DDHV) / (PHF x N x f _{HV}) | pc/h/ln |
| S | 62.9 | x f _p) | |
| D = v _p / S | 28.4 | S | mph |
| LOS | D | D = v _p / S | pc/mi/ln |
| | | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|--|---|---|--|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 SB</i> |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>N/O Davis</i> |
| Date Performed | <i>3/14/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>Baseline + Project PM</i> |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | <i>6452</i> | veh/h | Peak-Hour Factor, PHF <i>0.94</i> |
| AADT | | veh/day | %Trucks and Buses, P _T <i>9</i> |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R <i>0</i> |
| Peak-Hr Direction Prop, D | | | General Terrain: <i>Level</i> |
| DDHV = AADT x K x D | | veh/h | Grade % Length <i>mi</i> |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | <i>4</i> | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | FFS | <i>65.0</i> mph |
| Base free-flow Speed, BFFS | mph | | |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| $v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$ | <i>1793</i> pc/h/ln | Design LOS | |
| S | <i>62.8</i> mph | $v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$ | pc/h/ln |
| D = v _p / S | <i>28.5</i> pc/mi/ln | S | mph |
| LOS | <i>D</i> | D = v _p / S | pc/mi/ln |
| | | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service speed | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|----------|--|---------------|--------------------------------|-----------------|------|-----|-----|-----------------|--|--|-----|----------------|--|--|-----|----------------|------|-----|-----|------|-----|----------------------------|--|-----|--|--|--|
| General Information | | | Site Information | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Analyst | <i>Aaron Elias</i> | | Highway/Direction of Travel <i>I-880 SB</i> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | | From/To <i>N/O Davis</i> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date Performed | <i>3/14/2014</i> | | Jurisdiction | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Analysis Time Period | <i>PM Peak Hour</i> | | Analysis Year <i>2035 PM</i> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flow Inputs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Volume, V | 7063 | veh/h | Peak-Hour Factor, PHF | 0.94 | | | | | | | | | | | | | | | | | | | | | | | | | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peak-Hr Direction Prop, D | | | General Terrain: <i>Level</i> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DDHV = AADT x K x D | | veh/h | Grade % | Length | mi | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Up/Down % | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calculate Flow Adjustments | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f _p | 1.00 | | E _R | 1.2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.957 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Speed Inputs | | | Calc Speed Adj and FFS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lane Width | | ft | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">f_{LW}</td> <td colspan="2" style="padding: 5px;"></td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">f_{LC}</td> <td colspan="2" style="padding: 5px;"></td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">TRD Adjustment</td> <td colspan="2" style="padding: 5px;"></td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">FFS (measured)</td> <td style="padding: 5px; text-align: center;">65.0</td> <td style="padding: 5px;">mph</td> <td style="padding: 5px;">FFS</td> <td style="padding: 5px; text-align: center;">65.0</td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">Base free-flow Speed, BFFS</td> <td></td> <td style="padding: 5px;">mph</td> <td colspan="3"></td> </tr> </table> | | | f _{LW} | | | mph | f _{LC} | | | mph | TRD Adjustment | | | mph | FFS (measured) | 65.0 | mph | FFS | 65.0 | mph | Base free-flow Speed, BFFS | | mph | | | |
| f _{LW} | | | | | | mph | | | | | | | | | | | | | | | | | | | | | | | |
| f _{LC} | | | | | | mph | | | | | | | | | | | | | | | | | | | | | | | |
| TRD Adjustment | | | | | | mph | | | | | | | | | | | | | | | | | | | | | | | |
| FFS (measured) | 65.0 | mph | | | | FFS | 65.0 | mph | | | | | | | | | | | | | | | | | | | | | |
| Base free-flow Speed, BFFS | | mph | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rt-Side Lat. Clearance | | ft | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Lanes, N | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Ramp Density, TRD | | ramps/mi | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FFS (measured) | 65.0 | mph | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Base free-flow Speed, BFFS | | mph | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOS and Performance Measures | | | Design (N) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operational (LOS) | | | Design (N) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | | | Design LOS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S | 64.6 | mph | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D = v _p / S | 24.3 | pc/mi/ln | S | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOS | C | | D = v _p / S | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Required Number of Lanes, N | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Glossary | | | Factor Location | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | | f _{LW} - Exhibit 11-8 | | | | | | | | | | | | | | | | | | | | | | | | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | | f _{LC} - Exhibit 11-9 | | | | | | | | | | | | | | | | | | | | | | | | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | | TRD - Page 11-11 | | | | | | | | | | | | | | | | | | | | | | | | |
| LOS - Level of service speed | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DDHV - Directional design hour volume | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|--|------------------------------|----------|---|--------------------------------|-----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel | I-880 SB | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To | N/O Davis | |
| Date Performed | 3/14/2014 | | Jurisdiction | | |
| Analysis Time Period | PM Peak Hour | | Analysis Year | 2035 + Project PM | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 7141 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 5 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | mph | FFS | 65.0 | mph |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| Operational (LOS) | | | Design (N) | | |
| Design LOS | | | Design LOS | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | 1588 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln | |
| S | 64.5 | mph | S | mph | |
| D = v _p / S | 24.6 | pc/mi/ln | D = v _p / S | pc/mi/ln | |
| LOS | C | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service speed | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

I-880 South of Marina NB AM

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|-------------------------------------|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 NB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 2/19/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | 2013 |
| Project Description 6:45 - 7:45 AM | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 7957 | veh/h | Peak-Hour Factor, PHF 0.94 |
| AADT | | veh/day | %Trucks and Buses, P _T 9 |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R 0 |
| Peak-Hr Direction Prop, D | | | General Terrain: Level |
| DDHV = AADT x K x D | | veh/h | Grade % Length mi |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | 5 | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | 65.0 | FFS | 65.0 |
| Base free-flow Speed, BFFS | mph | | |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | 1769 pc/h/ln | Design LOS | |
| x f _p) | | v _p = (V or DDHV) / (PHF x N x f _{HV}) | pc/h/ln |
| S | 63.1 mph | x f _p) | |
| D = v _p / S | 28.0 pc/mi/ln | S | mph |
| LOS | D | D = v _p / S | pc/mi/ln |
| | | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|--|------------------------------|---|--|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 NB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 3/13/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Baseline AM |
| Project Description 6:45 - 7:45 AM | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 7989 | veh/h | Peak-Hour Factor, PHF 0.94 |
| AADT | | veh/day | %Trucks and Buses, P _T 9 |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R 0 |
| Peak-Hr Direction Prop, D | | | General Terrain: Level |
| DDHV = AADT x K x D | | veh/h | Grade % Length mi |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | |
| Number of Lanes, N | 5 | | f _{LW} mph |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} mph |
| FFS (measured) | 65.0 | mph | TRD Adjustment mph |
| Base free-flow Speed, BFFS | | mph | FFS 65.0 mph |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | 1776 | pc/h/ln | Design LOS |
| S | 63.0 | mph | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) |
| D = v _p / S | 28.2 | pc/mi/ln | S |
| LOS | D | | D = v _p / S |
| | | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|---|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 NB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 3/13/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Baseline + Project AM |
| Project Description 6:45 - 7:45 AM | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 8169 | veh/h | Peak-Hour Factor, PHF 0.94 |
| AADT | | veh/day | %Trucks and Buses, P _T 9 |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R 0 |
| Peak-Hr Direction Prop, D | | | General Terrain: Level |
| DDHV = AADT x K x D | | veh/h | Grade % Length mi |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | |
| Number of Lanes, N | 5 | | f _{LW} mph |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} mph |
| FFS (measured) | 65.0 | mph | TRD Adjustment mph |
| Base free-flow Speed, BFFS | | mph | FFS 65.0 mph |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | 1816 | pc/h/ln | |
| x f _p) | | | v _p = (V or DDHV) / (PHF x N x f _{HV}) |
| S | 62.5 | mph | x f _p) |
| D = v _p / S | 29.0 | pc/mi/ln | S |
| LOS | D | | D = v _p / S |
| | | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|--|------------------------------|----------|---|--------------------------------|--|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel I-880 NB | | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To S/O Marina Boulevard | | |
| Date Performed | 3/13/2014 | | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | | Analysis Year 2020 AM | | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 8335 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 5 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | | FFS | 65.0 | |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| <u>Operational (LOS)</u> | | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | 1853 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln | |
| S | 62.1 | mph | S | mph | |
| D = v _p / S | 29.8 | pc/mi/ln | D = v _p / S | pc/mi/ln | |
| LOS | D | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service speed | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | |
|--|---|---|---|-----------------|
| General Information | | Site Information | | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel <i>I-880 NB</i> | | |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> | |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | | |
| Analysis Time Period | <i>AM Peak Hour</i> | Analysis Year | <i>2020 + Project AM</i> | |
| Project Description | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data |
| Flow Inputs | | | | |
| Volume, V | <i>8484</i> | veh/h | Peak-Hour Factor, PHF | <i>0.94</i> |
| AADT | | veh/day | %Trucks and Buses, P _T | <i>9</i> |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | <i>0</i> |
| Peak-Hr Direction Prop, D | | | General Terrain: | <i>Level</i> |
| DDHV = AADT x K x D | | veh/h | Grade % Length | <i>mi</i> |
| | | | Up/Down % | |
| Calculate Flow Adjustments | | | | |
| f _p | <i>1.00</i> | | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph |
| Number of Lanes, N | <i>5</i> | | f _{LC} | mph |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | mph | FFS | <i>65.0</i> mph |
| Base free-flow Speed, BFFS | | mph | | |
| LOS and Performance Measures | | Design (N) | | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1886</i> | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln |
| S | <i>61.7</i> | mph | S | mph |
| D = v _p / S | <i>30.6</i> | pc/mi/ln | D = v _p / S | pc/mi/ln |
| LOS | <i>D</i> | | Required Number of Lanes, N | |
| Glossary | | Factor Location | | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|--|------------------------------|----------|---|--------------------------------|-----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel | I-880 NB | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To | S/O Marina Boulevard | |
| Date Performed | 3/13/2014 | | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | | Analysis Year | 2035 AM | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 8172 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 5 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | mph | FFS | 65.0 | mph |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| <u>Operational (LOS)</u> | | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | 1817 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln | |
| S | 62.5 | mph | S | mph | |
| D = v _p / S | 29.1 | pc/mi/ln | D = v _p / S | pc/mi/ln | |
| LOS | D | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service speed | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | |
|--|------------------------------|---|---|---------------|
| General Information | | Site Information | | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 NB | |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard | |
| Date Performed | 3/13/2014 | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | Analysis Year | 2035 + Project AM | |
| Project Description | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data |
| Flow Inputs | | | | |
| Volume, V | 8323 | veh/h | Peak-Hour Factor, PHF | 0.94 |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi |
| | | | Up/Down % | |
| Calculate Flow Adjustments | | | | |
| f _p | 1.00 | | E _R | 1.2 |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph |
| Number of Lanes, N | 5 | | f _{LC} | mph |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | 65.0 | mph | FFS | 65.0 |
| Base free-flow Speed, BFFS | | mph | | |
| LOS and Performance Measures | | Design (N) | | |
| Operational (LOS) | | Design (N) | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | 1851 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln |
| S | 62.1 | mph | S | mph |
| D = v _p / S | 29.8 | pc/mi/ln | D = v _p / S | pc/mi/ln |
| LOS | D | | Required Number of Lanes, N | |
| Glossary | | Factor Location | | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service speed | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | |

I-880 South of Marina NB PM

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|---|------------------------------|----------|---|--------------------------------|-----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel I-880 NB | | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To S/O Marina Boulevard | | |
| Date Performed | 3/13/2014 | | Jurisdiction | | |
| Analysis Time Period | PM Peak Hour | | Analysis Year 2013 | | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 7161 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 5 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | mph | FFS | 65.0 | mph |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| <u>Operational (LOS)</u> | | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | | Design LOS | | |
| | 1592 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) | | |
| x f _p) | | | x f _p) | | |
| S | 64.5 | mph | S | | |
| D = v _p / S | 24.7 | pc/mi/ln | D = v _p / S | | |
| LOS | C | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | |
|--|---|---|---|-----------------|
| General Information | | Site Information | | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 NB</i> | |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> | |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>Baseline PM</i> | |
| Project Description | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data |
| Flow Inputs | | | | |
| Volume, V | <i>7241</i> | veh/h | Peak-Hour Factor, PHF | <i>0.94</i> |
| AADT | | veh/day | %Trucks and Buses, P _T | <i>9</i> |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | <i>0</i> |
| Peak-Hr Direction Prop, D | | | General Terrain: | <i>Level</i> |
| DDHV = AADT x K x D | | veh/h | Grade % Length | <i>mi</i> |
| | | | Up/Down % | |
| Calculate Flow Adjustments | | | | |
| f _p | <i>1.00</i> | | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph |
| Number of Lanes, N | <i>5</i> | | f _{LC} | mph |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | mph | FFS | <i>65.0</i> mph |
| Base free-flow Speed, BFFS | | mph | | |
| LOS and Performance Measures | | Design (N) | | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1610</i> | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln |
| S | <i>64.4</i> | mph | S | mph |
| D = v _p / S | <i>25.0</i> | pc/mi/ln | D = v _p / S | pc/mi/ln |
| LOS | <i>C</i> | | Required Number of Lanes, N | |
| Glossary | | Factor Location | | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|---|------------------------------|----------|---|--------------------------------|-----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel I-880 NB | | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To S/O Marina Boulevard | | |
| Date Performed | 3/13/2014 | | Jurisdiction | | |
| Analysis Time Period | PM Peak Hour | | Analysis Year Baseline + Project PM | | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 7323 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 5 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | mph | FFS | 65.0 | mph |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| Operational (LOS) | | | Design (N) | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | | Design LOS | | |
| v _p | 1628 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) | pc/h/ln | |
| x f _p) | | | x f _p) | | |
| S | 64.3 | mph | S | mph | |
| D = v _p / S | 25.3 | pc/mi/ln | D = v _p / S | pc/mi/ln | |
| LOS | C | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|---|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 NB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 3/13/2014 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | 2020 PM |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 8034 | veh/h | Peak-Hour Factor, PHF 0.94 |
| AADT | | veh/day | %Trucks and Buses, P _T 9 |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R 0 |
| Peak-Hr Direction Prop, D | | | General Terrain: Level |
| DDHV = AADT x K x D | | veh/h | Grade % Length mi |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | f _{LW} mph |
| Number of Lanes, N | 5 | | f _{LC} mph |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment mph |
| FFS (measured) | 65.0 | mph | FFS 65.0 mph |
| Base free-flow Speed, BFFS | | mph | |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | 1786 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) |
| x f _p) | | | x f _p) |
| S | 62.9 | mph | S |
| D = v _p / S | 28.4 | pc/mi/ln | D = v _p / S |
| LOS | D | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|---|------------------------------|----------|---|--------------------------------|--|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel | I-880 NB | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To | S/O Marina Boulevard | |
| Date Performed | 3/13/2014 | | Jurisdiction | | |
| Analysis Time Period | PM Peak Hour | | Analysis Year | 2020 + Project PM | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 8095 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | ft | | | | |
| Rt-Side Lat. Clearance | ft | | f _{LW} | mph | |
| Number of Lanes, N | 5 | | f _{LC} | mph | |
| Total Ramp Density, TRD | ramps/mi | | TRD Adjustment | mph | |
| FFS (measured) | 65.0 mph | | FFS | 65.0 mph | |
| Base free-flow Speed, BFFS | mph | | | | |
| LOS and Performance Measures | | | Design (N) | | |
| Operational (LOS) | | | Design (N) | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | | Design LOS | | |
| v _p | 1800 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) | pc/h/ln | |
| S | 62.7 | mph | S | mph | |
| D = v _p / S | 28.7 | pc/mi/ln | D = v _p / S | pc/mi/ln | |
| LOS | D | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service speed | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|---|---|--|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 NB</i> |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>2035 PM</i> |
| Project Description | | | |
| <input type="checkbox"/> Oper.(LOS) | <input type="checkbox"/> Des.(N) | <input type="checkbox"/> Planning Data | |
| Flow Inputs | | | |
| Volume, V | <i>8692</i> | veh/h | Peak-Hour Factor, PHF <i>0.94</i> |
| AADT | | veh/day | %Trucks and Buses, P _T <i>9</i> |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R <i>0</i> |
| Peak-Hr Direction Prop, D | | | General Terrain: <i>Level</i> |
| DDHV = AADT x K x D | | veh/h | Grade % Length <i>mi</i> Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | <i>5</i> | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | FFS | <i>65.0</i> mph |
| Base free-flow Speed, BFFS | mph | | |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | <i>1933</i> pc/h/ln | Design LOS | |
| x f _p) | | v _p = (V or DDHV) / (PHF x N x f _{HV}) | pc/h/ln |
| S | <i>61.0</i> mph | x f _p) | |
| D = v _p / S | <i>31.7</i> pc/mi/ln | S | mph |
| LOS | <i>D</i> | D = v _p / S | pc/mi/ln |
| | | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|---|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 NB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 3/13/2014 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | 2035 + Project PM |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 8738 | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | %Trucks and Buses, P _T |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R |
| Peak-Hr Direction Prop, D | | | General Terrain: |
| DDHV = AADT x K x D | | veh/h | Grade % Length |
| | | | Up/Down % |
| | | | mi |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | |
| Number of Lanes, N | 5 | | f _{LW} |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} |
| FFS (measured) | 65.0 | mph | TRD Adjustment |
| Base free-flow Speed, BFFS | | mph | FFS |
| | | | 65.0 |
| | | | mph |
| LOS and Performance Measures | | Design (N) | |
| Operational (LOS) | | Design (N) | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | Design LOS | |
| | 1943 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) |
| | | | x f _p) |
| S | 60.8 | mph | S |
| D = v _p / S | 31.9 | pc/mi/ln | D = v _p / S |
| LOS | D | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

I-880 South of Marina SB AM

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|-----------------------------------|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel I-880 SB | |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 3/13/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | 2013 |
| Project Description | | | |
| Oper.(LOS) | Des.(N) | Planning Data | |
| Flow Inputs | | | |
| Volume, V | 6153 | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | 0.94 |
| Peak-Hr Prop. of AADT, K | | | %Trucks and Buses, P _T |
| Peak-Hr Direction Prop, D | | | 9 |
| DDHV = AADT x K x D | | veh/h | %RVs, P _R |
| | | | 0 |
| | | | General Terrain: Level |
| | | | Grade % Length mi |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.957 | |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | 5 | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | 65.0 | FFS | 65.0 |
| Base free-flow Speed, BFFS | mph | | mph |
| LOS and Performance Measures | | Design (N) | |
| Operational (LOS) | | Design (N) | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | Design LOS | |
| 1368 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) | |
| x f _p) | | pc/h/ln | |
| S | 65.0 | x f _p) | |
| D = v _p / S | 21.0 | S | mph |
| LOS | C | D = v _p / S | pc/mi/ln |
| | | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|---|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 SB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 3/13/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Baseline AM |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 6218 | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | %Trucks and Buses, P _T |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R |
| Peak-Hr Direction Prop, D | | | General Terrain: |
| DDHV = AADT x K x D | | veh/h | Grade % Length |
| | | | Up/Down % |
| | | | mi |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | |
| Number of Lanes, N | 5 | | f _{LW} |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} |
| FFS (measured) | 65.0 | mph | TRD Adjustment |
| Base free-flow Speed, BFFS | | mph | FFS |
| | | | 65.0 |
| | | | mph |
| LOS and Performance Measures | | Design (N) | |
| Operational (LOS) | | Design (N) | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | Design LOS | |
| | 1383 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) |
| | | | x f _p) |
| S | 65.0 | mph | S |
| D = v _p / S | 21.3 | pc/mi/ln | D = v _p / S |
| LOS | C | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|------------------------------|---|---|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 SB |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 3/13/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Baseline + Project AM |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | 6289 | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | %Trucks and Buses, P _T |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R |
| Peak-Hr Direction Prop, D | | | General Terrain: |
| DDHV = AADT x K x D | | veh/h | Grade % Length |
| | | | Up/Down % |
| | | | mi |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | |
| Number of Lanes, N | 5 | | f _{LW} |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} |
| FFS (measured) | 65.0 | mph | TRD Adjustment |
| Base free-flow Speed, BFFS | | mph | FFS |
| | | | 65.0 |
| | | | mph |
| LOS and Performance Measures | | Design (N) | |
| Operational (LOS) | | Design (N) | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | Design LOS | |
| | 1398 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) |
| | | | x f _p) |
| S | 65.0 | mph | S |
| D = v _p / S | 21.5 | pc/mi/ln | D = v _p / S |
| LOS | C | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|--|---|---|-----------------------------------|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 SB</i> |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>AM Peak Hour</i> | Analysis Year | <i>2020 AM</i> |
| Project Description | | | |
| Oper.(LOS) | Des.(N) | Planning Data | |
| Flow Inputs | | | |
| Volume, V | <i>7316</i> | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | <i>0.94</i> |
| Peak-Hr Prop. of AADT, K | | | %Trucks and Buses, P _T |
| Peak-Hr Direction Prop, D | | | <i>9</i> |
| DDHV = AADT x K x D | veh/h | | %RVs, P _R |
| | | | <i>0</i> |
| | | | General Terrain: |
| | | | <i>Level</i> |
| | | | Grade % Length |
| | | | <i>mi</i> |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | <i>5</i> | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | FFS | <i>65.0</i> |
| Base free-flow Speed, BFFS | mph | | mph |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| Design LOS | | Design LOS | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1627</i> pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln |
| S | <i>64.3</i> mph | S | mph |
| D = v _p / S | <i>25.3</i> pc/mi/ln | D = v _p / S | pc/mi/ln |
| LOS | <i>C</i> | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | |
|--|------------------------------|----------|---|--------------------------------|-----|
| General Information | | | Site Information | | |
| Analyst | Aaron Elias | | Highway/Direction of Travel I-880 SB | | |
| Agency or Company | Kittelson & Associates, Inc. | | From/To S/O Marina Boulevard | | |
| Date Performed | 3/13/2014 | | Jurisdiction | | |
| Analysis Time Period | AM Peak Hour | | Analysis Year 2020 + Project AM | | |
| Project Description | | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data | |
| Flow Inputs | | | | | |
| Volume, V | 7389 | veh/h | Peak-Hour Factor, PHF | 0.94 | |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 | |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level | |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi | |
| | | | Up/Down % | | |
| Calculate Flow Adjustments | | | | | |
| f _p | 1.00 | | E _R | 1.2 | |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 | |
| Speed Inputs | | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph | |
| Number of Lanes, N | 5 | | f _{LC} | mph | |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph | |
| FFS (measured) | 65.0 | mph | FFS | 65.0 | mph |
| Base free-flow Speed, BFFS | | mph | | | |
| LOS and Performance Measures | | | Design (N) | | |
| Operational (LOS) | | | Design (N) | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | | | Design LOS | | |
| | 1643 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | | |
| S | 64.2 | mph | S | | |
| D = v _p / S | 25.6 | pc/mi/ln | D = v _p / S | | |
| LOS | C | | Required Number of Lanes, N | | |
| Glossary | | | Factor Location | | |
| N - Number of lanes | S - Speed | | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service speed | BFFS - Base free-flow speed | | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|--|---|---|--|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 SB</i> |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>AM Peak Hour</i> | Analysis Year | <i>2035 AM</i> |
| Project Description | | | |
| Oper.(LOS) | Des.(N) | Planning Data | |
| Flow Inputs | | | |
| Volume, V | <i>8339</i> | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | <i>0.94</i> |
| Peak-Hr Prop. of AADT, K | | | %Trucks and Buses, P _T |
| Peak-Hr Direction Prop, D | | | <i>9</i> |
| DDHV = AADT x K x D | | veh/h | %RVs, P _R |
| | | | <i>0</i> |
| | | | General Terrain: |
| | | | <i>Level</i> |
| | | | Grade % Length |
| | | | <i>mi</i> |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | Calc Speed Adj and FFS | | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | f _{LW} |
| Number of Lanes, N | <i>5</i> | | mph |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} |
| FFS (measured) | <i>65.0</i> | mph | TRD Adjustment |
| Base free-flow Speed, BFFS | | mph | mph |
| | | | FFS |
| | | | <i>65.0</i> |
| | | | mph |
| LOS and Performance Measures | Design (N) | | |
| <u>Operational (LOS)</u> | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1854</i> | pc/h/ln | Design LOS |
| S | <i>62.1</i> | mph | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) |
| D = v _p / S | <i>29.9</i> | pc/mi/ln | pc/h/ln |
| LOS | <i>D</i> | | S |
| | | | mph |
| | | | D = v _p / S |
| | | | pc/mi/ln |
| | | | Required Number of Lanes, N |
| Glossary | Factor Location | | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|--|------------------------------|---|-------------------------------------|
| General Information | | Site Information | |
| Analyst | Aaron Elias | Highway/Direction of Travel I-880 SB | |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard |
| Date Performed | 3/13/2014 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | 2035 + Project AM |
| Project Description | | | |
| Oper.(LOS) | Des.(N) | Planning Data | |
| Flow Inputs | | | |
| Volume, V | 8403 | veh/h | Peak-Hour Factor, PHF 0.94 |
| AADT | | veh/day | %Trucks and Buses, P _T 9 |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R 0 |
| Peak-Hr Direction Prop, D | | | General Terrain: Level |
| DDHV = AADT x K x D | | veh/h | Grade % Length mi |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | 1.00 | E _R | 1.2 |
| E _T | 1.5 | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.957 | |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | 5 | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | 65.0 | FFS | 65.0 |
| Base free-flow Speed, BFFS | mph | | |
| LOS and Performance Measures | | Design (N) | |
| Operational (LOS) | | Design (N) | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | | Design LOS | |
| v _p | 1868 | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln |
| S | 61.9 | S | mph |
| D = v _p / S | 30.2 | D = v _p / S | pc/mi/ln |
| LOS | D | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

I-880 South of Marina SB PM

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|---|---|-----------------------------------|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel <i>I-880 SB</i> | |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>2013</i> |
| Project Description | | | |
| <input type="checkbox"/> Oper.(LOS) | <input type="checkbox"/> Des.(N) | <input type="checkbox"/> Planning Data | |
| Flow Inputs | | | |
| Volume, V | <i>7508</i> | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | <i>0.94</i> |
| Peak-Hr Prop. of AADT, K | | | %Trucks and Buses, P _T |
| Peak-Hr Direction Prop, D | | | <i>9</i> |
| DDHV = AADT x K x D | | veh/h | %RVs, P _R |
| | | | <i>0</i> |
| | | | General Terrain: |
| | | | <i>Level</i> |
| | | | Grade % Length |
| | | | <i>mi</i> |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | |
| <i>0.957</i> | | | |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | <i>5</i> | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | FFS | <i>65.0</i> |
| Base free-flow Speed, BFFS | mph | | |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | | Design LOS | |
| <i>1669</i> | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) | |
| x f _p) | | <i>1669</i> | |
| S | <i>64.0</i> | x f _p) | pc/h/ln |
| D = v _p / S | <i>26.1</i> | S | mph |
| LOS | <i>D</i> | D = v _p / S | pc/mi/ln |
| | | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|---|---|---|---|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel <i>I-880 SB</i> | |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>Baseline PM</i> |
| Project Description | | | |
| Oper.(LOS) | | Des.(N) | Planning Data |
| Flow Inputs | | | |
| Volume, V | <i>7692</i> | veh/h | Peak-Hour Factor, PHF <i>0.94</i> |
| AADT | | veh/day | %Trucks and Buses, P _T <i>9</i> |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R <i>0</i> |
| Peak-Hr Direction Prop, D | | | General Terrain: <i>Level</i> |
| DDHV = AADT x K x D | | veh/h | Grade % Length <i>mi</i> |
| | | | Up/Down % |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | | ft | |
| Rt-Side Lat. Clearance | | ft | f _{LW} |
| Number of Lanes, N | <i>5</i> | | mph |
| Total Ramp Density, TRD | | ramps/mi | f _{LC} |
| FFS (measured) | <i>65.0</i> | mph | TRD Adjustment |
| Base free-flow Speed, BFFS | | mph | FFS |
| | | | <i>65.0</i> |
| | | | mph |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | <i>1710</i> | pc/h/ln | Design LOS |
| x f _p) | | | v _p = (V or DDHV) / (PHF x N x f _{HV}) |
| S | <i>63.6</i> | mph | x f _p) |
| D = v _p / S | <i>26.9</i> | pc/mi/ln | S |
| LOS | <i>D</i> | | D = v _p / S |
| | | | pc/mi/ln |
| | | | Required Number of Lanes, N |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | | | | | | | |
|--|---|--|--|-----------------|-----|-----------------|-----|----------------|-----|-----|-----------------|
| General Information | | Site Information | | | | | | | | | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel <i>I-880 SB</i> | | | | | | | | | |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> | | | | | | | | |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | | | | | | | | | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>Baseline + Project PM</i> | | | | | | | | |
| Project Description | | | | | | | | | | | |
| Oper.(LOS) | Des.(N) | Planning Data | | | | | | | | | |
| Flow Inputs | | | | | | | | | | | |
| Volume, V | <i>7866</i> | veh/h | Peak-Hour Factor, PHF <i>0.94</i> | | | | | | | | |
| AADT | | veh/day | %Trucks and Buses, P _T <i>9</i> | | | | | | | | |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R <i>0</i> | | | | | | | | |
| Peak-Hr Direction Prop, D | | | General Terrain: <i>Level</i> | | | | | | | | |
| DDHV = AADT x K x D | | veh/h | Grade % Length <i>mi</i> Up/Down % | | | | | | | | |
| Calculate Flow Adjustments | | | | | | | | | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> | | | | | | | | |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] <i>0.957</i> | | | | | | | | | |
| Speed Inputs | | Calc Speed Adj and FFS | | | | | | | | | |
| Lane Width | ft | <table style="width:100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">f_{LW}</td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">f_{LC}</td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">TRD Adjustment</td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">FFS</td> <td style="padding: 5px;"><i>65.0</i> mph</td> </tr> </table> | | f _{LW} | mph | f _{LC} | mph | TRD Adjustment | mph | FFS | <i>65.0</i> mph |
| f _{LW} | mph | | | | | | | | | | |
| f _{LC} | mph | | | | | | | | | | |
| TRD Adjustment | mph | | | | | | | | | | |
| FFS | <i>65.0</i> mph | | | | | | | | | | |
| Rt-Side Lat. Clearance | ft | | | | | | | | | | |
| Number of Lanes, N | <i>5</i> | | | | | | | | | | |
| Total Ramp Density, TRD | ramps/mi | | | | | | | | | | |
| FFS (measured) | <i>65.0</i> mph | | | | | | | | | | |
| Base free-flow Speed, BFFS | mph | | | | | | | | | | |
| LOS and Performance Measures | | Design (N) | | | | | | | | | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | | | | | | | | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1749</i> pc/h/ln | Design LOS | | | | | | | | | |
| S | <i>63.3</i> mph | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln | | | | | | | | |
| D = v _p / S | <i>27.6</i> pc/mi/ln | S | mph | | | | | | | | |
| LOS | <i>D</i> | D = v _p / S | pc/mi/ln | | | | | | | | |
| | | Required Number of Lanes, N | | | | | | | | | |
| Glossary | | Factor Location | | | | | | | | | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | | | | | | | | |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | | | | | | | | |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 | | | | | | | | |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | | | | | | | | |
| DDHV - Directional design hour volume | | | | | | | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | | | | | | | | |
|--|---|--|-----------------------------------|-----------------|-----|-----------------|-----|----------------|-----|-----|-----------------|
| General Information | | Site Information | | | | | | | | | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 SB</i> | | | | | | | | |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> | | | | | | | | |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | | | | | | | | | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>2020 PM</i> | | | | | | | | |
| Project Description | | | | | | | | | | | |
| ☐ Oper.(LOS) | ☐ Des.(N) | ☐ Planning Data | | | | | | | | | |
| Flow Inputs | | | | | | | | | | | |
| Volume, V | <i>8359</i> | veh/h | Peak-Hour Factor, PHF | | | | | | | | |
| AADT | | veh/day | <i>0.94</i> | | | | | | | | |
| Peak-Hr Prop. of AADT, K | | | %Trucks and Buses, P _T | | | | | | | | |
| Peak-Hr Direction Prop, D | | | <i>9</i> | | | | | | | | |
| DDHV = AADT x K x D | | veh/h | %RVs, P _R | | | | | | | | |
| | | | <i>0</i> | | | | | | | | |
| | | | General Terrain: | | | | | | | | |
| | | | <i>Level</i> | | | | | | | | |
| | | | Grade % Length | | | | | | | | |
| | | | <i>mi</i> | | | | | | | | |
| | | | Up/Down % | | | | | | | | |
| Calculate Flow Adjustments | | | | | | | | | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> | | | | | | | | |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> | | | | | | | | |
| Speed Inputs | | Calc Speed Adj and FFS | | | | | | | | | |
| Lane Width | ft | <table style="width:100%; border:none;"> <tr> <td style="padding: 5px;">f_{LW}</td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">f_{LC}</td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">TRD Adjustment</td> <td style="padding: 5px;">mph</td> </tr> <tr> <td style="padding: 5px;">FFS</td> <td style="padding: 5px;"><i>65.0</i> mph</td> </tr> </table> | | f _{LW} | mph | f _{LC} | mph | TRD Adjustment | mph | FFS | <i>65.0</i> mph |
| f _{LW} | mph | | | | | | | | | | |
| f _{LC} | mph | | | | | | | | | | |
| TRD Adjustment | mph | | | | | | | | | | |
| FFS | <i>65.0</i> mph | | | | | | | | | | |
| Rt-Side Lat. Clearance | ft | | | | | | | | | | |
| Number of Lanes, N | <i>5</i> | | | | | | | | | | |
| Total Ramp Density, TRD | ramps/mi | | | | | | | | | | |
| FFS (measured) | <i>65.0</i> mph | | | | | | | | | | |
| Base free-flow Speed, BFFS | mph | | | | | | | | | | |
| LOS and Performance Measures | | Design (N) | | | | | | | | | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | | | | | | | | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1859</i> pc/h/ln | Design LOS | | | | | | | | | |
| S | <i>62.0</i> mph | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln | | | | | | | | |
| D = v _p / S | <i>30.0</i> pc/mi/ln | S | mph | | | | | | | | |
| LOS | <i>D</i> | D = v _p / S | pc/mi/ln | | | | | | | | |
| | | Required Number of Lanes, N | | | | | | | | | |
| Glossary | | Factor Location | | | | | | | | | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | | | | | | | | |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | | | | | | | | |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 | | | | | | | | |
| LOS - Level of service speed | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | | | | | | | | |
| DDHV - Directional design hour volume | | | | | | | | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | |
|--|---|---|---|-----------------|
| General Information | | Site Information | | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel <i>I-880 SB</i> | | |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> | |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>2020 + Project PM</i> | |
| Project Description | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data |
| Flow Inputs | | | | |
| Volume, V | <i>8504</i> | veh/h | Peak-Hour Factor, PHF | <i>0.94</i> |
| AADT | | veh/day | %Trucks and Buses, P _T | <i>9</i> |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | <i>0</i> |
| Peak-Hr Direction Prop, D | | | General Terrain: | <i>Level</i> |
| DDHV = AADT x K x D | | veh/h | Grade % Length | <i>mi</i> |
| | | | Up/Down % | |
| Calculate Flow Adjustments | | | | |
| f _p | <i>1.00</i> | | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph |
| Number of Lanes, N | <i>5</i> | | f _{LC} | mph |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | mph | FFS | <i>65.0</i> mph |
| Base free-flow Speed, BFFS | | mph | | |
| LOS and Performance Measures | | Design (N) | | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1891</i> | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln |
| S | <i>61.6</i> | mph | S | mph |
| D = v _p / S | <i>30.7</i> | pc/mi/ln | D = v _p / S | pc/mi/ln |
| LOS | <i>D</i> | | Required Number of Lanes, N | |
| Glossary | | Factor Location | | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | |
|--|---|---|-----------------------------------|
| General Information | | Site Information | |
| Analyst | <i>Aaron Elias</i> | Highway/Direction of Travel | <i>I-880 SB</i> |
| Agency or Company | <i>Kittelson & Associates, Inc.</i> | From/To | <i>S/O Marina Boulevard</i> |
| Date Performed | <i>3/13/2014</i> | Jurisdiction | |
| Analysis Time Period | <i>PM Peak Hour</i> | Analysis Year | <i>2035 PM</i> |
| Project Description | | | |
| Ⓜ Oper.(LOS) | Ⓜ Des.(N) | Ⓜ Planning Data | |
| Flow Inputs | | | |
| Volume, V | <i>8205</i> | veh/h | Peak-Hour Factor, PHF |
| AADT | | veh/day | <i>0.94</i> |
| Peak-Hr Prop. of AADT, K | | | %Trucks and Buses, P _T |
| Peak-Hr Direction Prop, D | | | <i>9</i> |
| DDHV = AADT x K x D | | veh/h | %RVs, P _R |
| | | | <i>0</i> |
| | | | General Terrain: |
| | | | <i>Level</i> |
| | | | Grade % Length |
| | | | <i>mi</i> |
| | | | Up/Down % |
| | | | |
| Calculate Flow Adjustments | | | |
| f _p | <i>1.00</i> | E _R | <i>1.2</i> |
| E _T | <i>1.5</i> | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | <i>0.957</i> |
| Speed Inputs | | Calc Speed Adj and FFS | |
| Lane Width | ft | | |
| Rt-Side Lat. Clearance | ft | f _{LW} | mph |
| Number of Lanes, N | <i>5</i> | f _{LC} | mph |
| Total Ramp Density, TRD | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | <i>65.0</i> | FFS | <i>65.0</i> |
| Base free-flow Speed, BFFS | mph | | mph |
| LOS and Performance Measures | | Design (N) | |
| <u>Operational (LOS)</u> | | <u>Design (N)</u> | |
| v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | <i>1824</i> pc/h/ln | Design LOS | |
| S | <i>62.5</i> mph | v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) | pc/h/ln |
| D = v _p / S | <i>29.2</i> pc/mi/ln | S | mph |
| LOS | <i>D</i> | D = v _p / S | pc/mi/ln |
| | | Required Number of Lanes, N | |
| Glossary | | Factor Location | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 |
| LOS - Level of service speed | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | |
| DDHV - Directional design hour volume | | | |

| BASIC FREEWAY SEGMENTS WORKSHEET | | | | |
|---|------------------------------|---|---|---------------|
| General Information | | Site Information | | |
| Analyst | Aaron Elias | Highway/Direction of Travel | I-880 SB | |
| Agency or Company | Kittelson & Associates, Inc. | From/To | S/O Marina Boulevard | |
| Date Performed | 3/13/2014 | Jurisdiction | | |
| Analysis Time Period | PM Peak Hour | Analysis Year | 2035 + Project PM | |
| Project Description | | | | |
| Oper.(LOS) | | Des.(N) | | Planning Data |
| Flow Inputs | | | | |
| Volume, V | 8347 | veh/h | Peak-Hour Factor, PHF | 0.94 |
| AADT | | veh/day | %Trucks and Buses, P _T | 9 |
| Peak-Hr Prop. of AADT, K | | | %RVs, P _R | 0 |
| Peak-Hr Direction Prop, D | | | General Terrain: | Level |
| DDHV = AADT x K x D | | veh/h | Grade % Length | mi |
| | | | Up/Down % | |
| Calculate Flow Adjustments | | | | |
| f _p | 1.00 | | E _R | 1.2 |
| E _T | 1.5 | | f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] | 0.957 |
| Speed Inputs | | Calc Speed Adj and FFS | | |
| Lane Width | | ft | | |
| Rt-Side Lat. Clearance | | ft | f _{LW} | mph |
| Number of Lanes, N | 5 | | f _{LC} | mph |
| Total Ramp Density, TRD | | ramps/mi | TRD Adjustment | mph |
| FFS (measured) | 65.0 | mph | FFS | 65.0 |
| Base free-flow Speed, BFFS | | mph | | |
| LOS and Performance Measures | | Design (N) | | |
| Operational (LOS) | | Design (N) | | |
| v _p = (V or DDHV) / (PHF x N x f _{HV}) | 1856 | pc/h/ln | v _p = (V or DDHV) / (PHF x N x f _{HV}) | pc/h/ln |
| S | 62.1 | mph | S | mph |
| D = v _p / S | 29.9 | pc/mi/ln | D = v _p / S | pc/mi/ln |
| LOS | D | | Required Number of Lanes, N | |
| Glossary | | Factor Location | | |
| N - Number of lanes | S - Speed | E _R - Exhibits 11-10, 11-12 | f _{LW} - Exhibit 11-8 | |
| V - Hourly volume | D - Density | E _T - Exhibits 11-10, 11-11, 11-13 | f _{LC} - Exhibit 11-9 | |
| v _p - Flow rate | FFS - Free-flow speed | f _p - Page 11-18 | TRD - Page 11-11 | |
| LOS - Level of service | BFFS - Base free-flow speed | LOS, S, FFS, v _p - Exhibits 11-2, 11-3 | | |
| DDHV - Directional design hour volume | | | | |

Appendix 7 Traffic Count Data

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

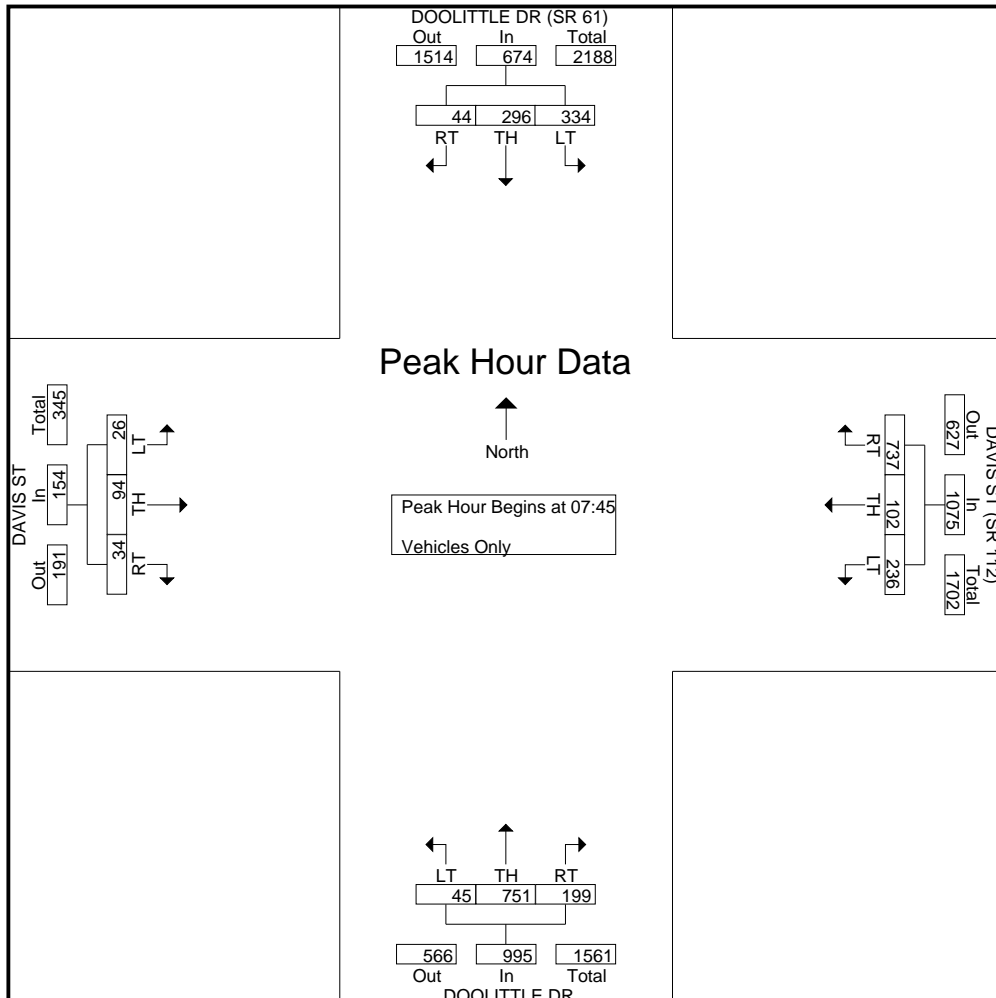
File Name : doolittle-davis-a
Site Code : 1
Start Date : 1/23/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR (SR 61) Southbound | | | | DAVIS ST (SR 112) Westbound | | | | DOOLITTLE DR Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|--------------------|------------------------------------|------------|------------|-------------|--------------------------------|------------|------------|-------------|----------------------------|-------------|-----------|-------------|-----------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 6 | 46 | 51 | 103 | 99 | 37 | 37 | 173 | 43 | 69 | 4 | 116 | 4 | 18 | 3 | 25 | 417 |
| 07:15 | 8 | 62 | 61 | 131 | 171 | 25 | 43 | 239 | 29 | 93 | 2 | 124 | 4 | 23 | 4 | 31 | 525 |
| 07:30 | 10 | 59 | 73 | 142 | 182 | 33 | 54 | 269 | 52 | 166 | 6 | 224 | 4 | 45 | 10 | 59 | 694 |
| 07:45 | 10 | 71 | 63 | 144 | 212 | 19 | 70 | 301 | 63 | 218 | 7 | 288 | 5 | 17 | 3 | 25 | 758 |
| Total | 34 | 238 | 248 | 520 | 664 | 114 | 204 | 982 | 187 | 546 | 19 | 752 | 17 | 103 | 20 | 140 | 2394 |
| 08:00 | 10 | 82 | 80 | 172 | 158 | 27 | 58 | 243 | 48 | 219 | 9 | 276 | 6 | 27 | 6 | 39 | 730 |
| 08:15 | 10 | 72 | 86 | 168 | 173 | 26 | 56 | 255 | 46 | 170 | 16 | 232 | 4 | 23 | 9 | 36 | 691 |
| 08:30 | 14 | 71 | 105 | 190 | 194 | 30 | 52 | 276 | 42 | 144 | 13 | 199 | 19 | 27 | 8 | 54 | 719 |
| 08:45 | 12 | 73 | 100 | 185 | 178 | 28 | 50 | 256 | 21 | 103 | 14 | 138 | 6 | 33 | 11 | 50 | 629 |
| Total | 46 | 298 | 371 | 715 | 703 | 111 | 216 | 1030 | 157 | 636 | 52 | 845 | 35 | 110 | 34 | 179 | 2769 |
| Grand Total | 80 | 536 | 619 | 1235 | 1367 | 225 | 420 | 2012 | 344 | 1182 | 71 | 1597 | 52 | 213 | 54 | 319 | 5163 |
| Apprch % | 6.5 | 43.4 | 50.1 | | 67.9 | 11.2 | 20.9 | | 21.5 | 74 | 4.4 | | 16.3 | 66.8 | 16.9 | | |
| Total % | 1.5 | 10.4 | 12 | 23.9 | 26.5 | 4.4 | 8.1 | 39 | 6.7 | 22.9 | 1.4 | 30.9 | 1 | 4.1 | 1 | 6.2 | |

| Start Time | DOOLITTLE DR (SR 61) Southbound | | | | DAVIS ST (SR 112) Westbound | | | | DOOLITTLE DR Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|---------------------|------------------------------------|------------|------------|------------|--------------------------------|------------|------------|-------------|----------------------------|------------|-----------|------------|-----------------------|-----------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:45 | 10 | 71 | 63 | 144 | 212 | 19 | 70 | 301 | 63 | 218 | 7 | 288 | 5 | 17 | 3 | 25 | 758 |
| 08:00 | 10 | 82 | 80 | 172 | 158 | 27 | 58 | 243 | 48 | 219 | 9 | 276 | 6 | 27 | 6 | 39 | 730 |
| 08:15 | 10 | 72 | 86 | 168 | 173 | 26 | 56 | 255 | 46 | 170 | 16 | 232 | 4 | 23 | 9 | 36 | 691 |
| 08:30 | 14 | 71 | 105 | 190 | 194 | 30 | 52 | 276 | 42 | 144 | 13 | 199 | 19 | 27 | 8 | 54 | 719 |
| Total Volume | 44 | 296 | 334 | 674 | 737 | 102 | 236 | 1075 | 199 | 751 | 45 | 995 | 34 | 94 | 26 | 154 | 2898 |
| % App. Total | 6.5 | 43.9 | 49.6 | | 68.6 | 9.5 | 22 | | 20 | 75.5 | 4.5 | | 22.1 | 61 | 16.9 | | |
| PHF | .786 | .902 | .795 | .887 | .869 | .850 | .843 | .893 | .790 | .857 | .703 | .864 | .447 | .870 | .722 | .713 | .956 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:45



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

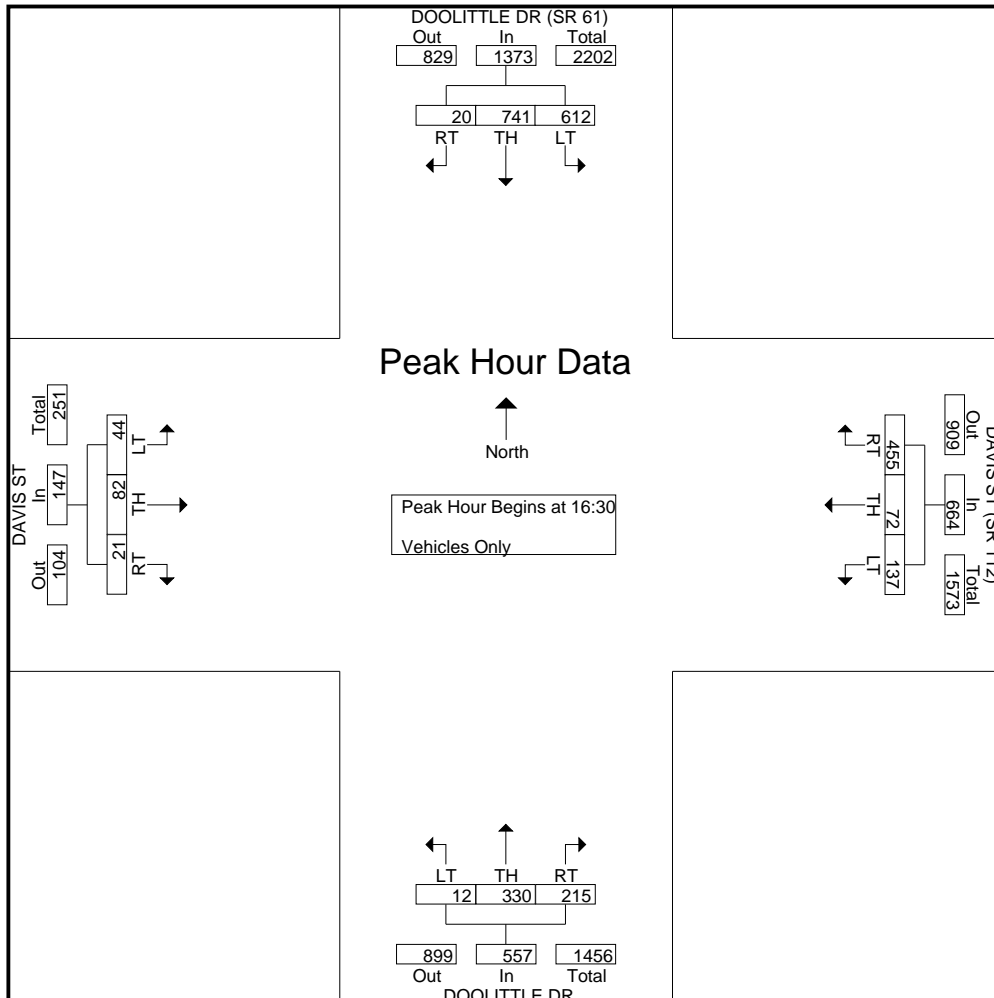
File Name : doolittle-davis-p
Site Code : 1
Start Date : 1/23/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR (SR 61) Southbound | | | | DAVIS ST (SR 112) Westbound | | | | DOOLITTLE DR Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|--------------------|------------------------------------|-------------|-------------|-------------|--------------------------------|------------|------------|-------------|----------------------------|------------|-----------|-------------|-----------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 6 | 134 | 120 | 260 | 98 | 21 | 34 | 153 | 52 | 87 | 6 | 145 | 10 | 38 | 24 | 72 | 630 |
| 16:15 | 8 | 145 | 123 | 276 | 105 | 23 | 28 | 156 | 55 | 60 | 4 | 119 | 12 | 26 | 14 | 52 | 603 |
| 16:30 | 5 | 166 | 154 | 325 | 114 | 25 | 30 | 169 | 67 | 79 | 3 | 149 | 6 | 25 | 12 | 43 | 686 |
| 16:45 | 6 | 154 | 142 | 302 | 119 | 14 | 41 | 174 | 41 | 81 | 3 | 125 | 4 | 18 | 11 | 33 | 634 |
| Total | 25 | 599 | 539 | 1163 | 436 | 83 | 133 | 652 | 215 | 307 | 16 | 538 | 32 | 107 | 61 | 200 | 2553 |
| 17:00 | 6 | 217 | 166 | 389 | 115 | 14 | 40 | 169 | 68 | 101 | 2 | 171 | 7 | 23 | 8 | 38 | 767 |
| 17:15 | 3 | 204 | 150 | 357 | 107 | 19 | 26 | 152 | 39 | 69 | 4 | 112 | 4 | 16 | 13 | 33 | 654 |
| 17:30 | 4 | 169 | 152 | 325 | 118 | 16 | 34 | 168 | 39 | 58 | 4 | 101 | 5 | 8 | 12 | 25 | 619 |
| 17:45 | 3 | 150 | 129 | 282 | 103 | 9 | 32 | 144 | 36 | 59 | 2 | 97 | 2 | 15 | 9 | 26 | 549 |
| Total | 16 | 740 | 597 | 1353 | 443 | 58 | 132 | 633 | 182 | 287 | 12 | 481 | 18 | 62 | 42 | 122 | 2589 |
| Grand Total | 41 | 1339 | 1136 | 2516 | 879 | 141 | 265 | 1285 | 397 | 594 | 28 | 1019 | 50 | 169 | 103 | 322 | 5142 |
| Apprch % | 1.6 | 53.2 | 45.2 | | 68.4 | 11 | 20.6 | | 39 | 58.3 | 2.7 | | 15.5 | 52.5 | 32 | | |
| Total % | 0.8 | 26 | 22.1 | 48.9 | 17.1 | 2.7 | 5.2 | 25 | 7.7 | 11.6 | 0.5 | 19.8 | 1 | 3.3 | 2 | 6.3 | |

| Start Time | DOOLITTLE DR (SR 61) Southbound | | | | DAVIS ST (SR 112) Westbound | | | | DOOLITTLE DR Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|---------------------|------------------------------------|------------|------------|-------------|--------------------------------|-----------|------------|------------|----------------------------|------------|-----------|------------|-----------------------|-----------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:30 | 5 | 166 | 154 | 325 | 114 | 25 | 30 | 169 | 67 | 79 | 3 | 149 | 6 | 25 | 12 | 43 | 686 |
| 16:45 | 6 | 154 | 142 | 302 | 119 | 14 | 41 | 174 | 41 | 81 | 3 | 125 | 4 | 18 | 11 | 33 | 634 |
| 17:00 | 6 | 217 | 166 | 389 | 115 | 14 | 40 | 169 | 68 | 101 | 2 | 171 | 7 | 23 | 8 | 38 | 767 |
| 17:15 | 3 | 204 | 150 | 357 | 107 | 19 | 26 | 152 | 39 | 69 | 4 | 112 | 4 | 16 | 13 | 33 | 654 |
| Total Volume | 20 | 741 | 612 | 1373 | 455 | 72 | 137 | 664 | 215 | 330 | 12 | 557 | 21 | 82 | 44 | 147 | 2741 |
| % App. Total | 1.5 | 54 | 44.6 | | 68.5 | 10.8 | 20.6 | | 38.6 | 59.2 | 2.2 | | 14.3 | 55.8 | 29.9 | | |
| PHF | .833 | .854 | .922 | .882 | .956 | .720 | .835 | .954 | .790 | .817 | .750 | .814 | .750 | .820 | .846 | .855 | .893 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-davis-s
Site Code : 1
Start Date : 1/26/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR (SR 61) Southbound | | | | DAVIS ST (SR 112) Westbound | | | | DOOLITTLE DR Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|-------------|------------------------------------|------|------|------------|--------------------------------|-----|-----|------------|----------------------------|------|-----|------------|-----------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 5 | 47 | 77 | 129 | 46 | 19 | 29 | 94 | 29 | 37 | 1 | 67 | 2 | 9 | 1 | 12 | 302 |
| 10:15 | 7 | 51 | 74 | 132 | 71 | 21 | 33 | 125 | 28 | 45 | 6 | 79 | 2 | 11 | 1 | 14 | 350 |
| 10:30 | 6 | 46 | 69 | 121 | 82 | 28 | 33 | 143 | 32 | 40 | 6 | 78 | 2 | 13 | 4 | 19 | 361 |
| 10:45 | 7 | 49 | 70 | 126 | 86 | 17 | 31 | 134 | 12 | 24 | 5 | 41 | 3 | 8 | 0 | 11 | 312 |
| Total | 25 | 193 | 290 | 508 | 285 | 85 | 126 | 496 | 101 | 146 | 18 | 265 | 9 | 41 | 6 | 56 | 1325 |
| 11:00 | 7 | 62 | 72 | 141 | 70 | 29 | 42 | 141 | 41 | 47 | 4 | 92 | 6 | 19 | 4 | 29 | 403 |
| 11:15 | 8 | 40 | 82 | 130 | 81 | 19 | 27 | 127 | 23 | 54 | 1 | 78 | 4 | 9 | 1 | 14 | 349 |
| 11:30 | 9 | 85 | 88 | 182 | 75 | 23 | 39 | 137 | 24 | 48 | 2 | 74 | 2 | 14 | 8 | 24 | 417 |
| 11:45 | 4 | 68 | 89 | 161 | 79 | 24 | 31 | 134 | 40 | 53 | 5 | 98 | 3 | 28 | 1 | 32 | 425 |
| Total | 28 | 255 | 331 | 614 | 305 | 95 | 139 | 539 | 128 | 202 | 12 | 342 | 15 | 70 | 14 | 99 | 1594 |
| 12:00 | 7 | 65 | 85 | 157 | 72 | 17 | 25 | 114 | 52 | 60 | 4 | 116 | 5 | 19 | 0 | 24 | 411 |
| 12:15 | 5 | 57 | 96 | 158 | 80 | 10 | 29 | 119 | 32 | 44 | 5 | 81 | 2 | 9 | 3 | 14 | 372 |
| 12:30 | 8 | 63 | 84 | 155 | 82 | 18 | 36 | 136 | 29 | 46 | 0 | 75 | 15 | 20 | 4 | 39 | 405 |
| 12:45 | 5 | 63 | 91 | 159 | 72 | 19 | 28 | 119 | 29 | 55 | 9 | 93 | 4 | 17 | 11 | 32 | 403 |
| Total | 25 | 248 | 356 | 629 | 306 | 64 | 118 | 488 | 142 | 205 | 18 | 365 | 26 | 65 | 18 | 109 | 1591 |
| 13:00 | 6 | 83 | 98 | 187 | 76 | 13 | 28 | 117 | 35 | 49 | 6 | 90 | 4 | 21 | 3 | 28 | 422 |
| 13:15 | 4 | 65 | 66 | 135 | 57 | 18 | 33 | 108 | 24 | 51 | 6 | 81 | 5 | 11 | 1 | 17 | 341 |
| 13:30 | 3 | 70 | 114 | 187 | 63 | 18 | 29 | 110 | 24 | 52 | 2 | 78 | 1 | 17 | 4 | 22 | 397 |
| 13:45 | 6 | 59 | 87 | 152 | 68 | 21 | 19 | 108 | 24 | 38 | 1 | 63 | 3 | 16 | 1 | 20 | 343 |
| Total | 19 | 277 | 365 | 661 | 264 | 70 | 109 | 443 | 107 | 190 | 15 | 312 | 13 | 65 | 9 | 87 | 1503 |
| Grand Total | 97 | 973 | 1342 | 2412 | 1160 | 314 | 492 | 1966 | 478 | 743 | 63 | 1284 | 63 | 241 | 47 | 351 | 6013 |
| Apprch % | 4 | 40.3 | 55.6 | | 59 | 16 | 25 | | 37.2 | 57.9 | 4.9 | | 17.9 | 68.7 | 13.4 | | |
| Total % | 1.6 | 16.2 | 22.3 | 40.1 | 19.3 | 5.2 | 8.2 | 32.7 | 7.9 | 12.4 | 1 | 21.4 | 1 | 4 | 0.8 | 5.8 | |

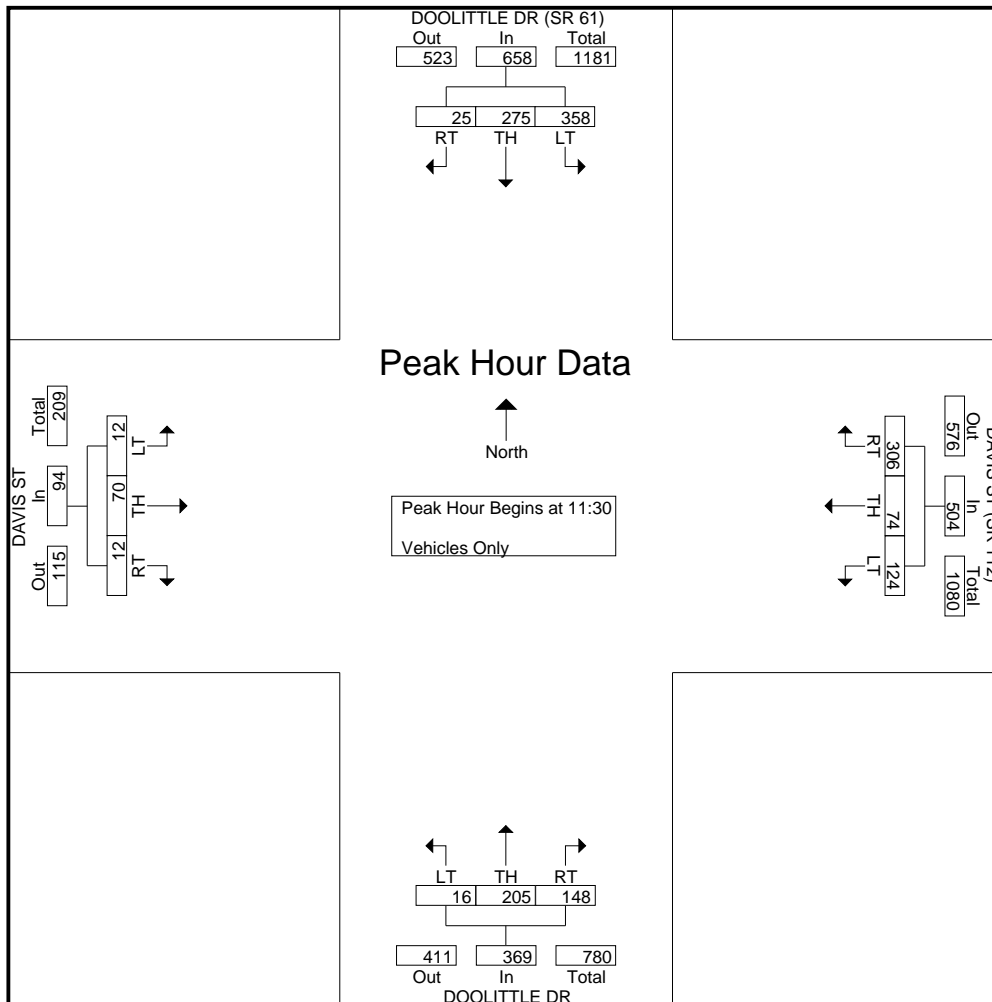
| Start Time | DOOLITTLE DR (SR 61) Southbound | | | | DAVIS ST (SR 112) Westbound | | | | DOOLITTLE DR Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|--|------------------------------------|-----------|-----------|------------|--------------------------------|-----------|-----------|------------|----------------------------|-----------|----------|------------|-----------------------|-----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 11:30 | | | | | | | | | | | | | | | | | |
| 11:30 | 9 | 85 | 88 | 182 | 75 | 23 | 39 | 137 | 24 | 48 | 2 | 74 | 2 | 14 | 8 | 24 | 417 |
| 11:45 | 4 | 68 | 89 | 161 | 79 | 24 | 31 | 134 | 40 | 53 | 5 | 98 | 3 | 28 | 1 | 32 | 425 |
| 12:00 | 7 | 65 | 85 | 157 | 72 | 17 | 25 | 114 | 52 | 60 | 4 | 116 | 5 | 19 | 0 | 24 | 411 |
| 12:15 | 5 | 57 | 96 | 158 | 80 | 10 | 29 | 119 | 32 | 44 | 5 | 81 | 2 | 9 | 3 | 14 | 372 |
| Total Volume | 25 | 275 | 358 | 658 | 306 | 74 | 124 | 504 | 148 | 205 | 16 | 369 | 12 | 70 | 12 | 94 | 1625 |
| % App. Total | 3.8 | 41.8 | 54.4 | | 60.7 | 14.7 | 24.6 | | 40.1 | 55.6 | 4.3 | | 12.8 | 74.5 | 12.8 | | |
| PHF | .694 | .809 | .932 | .904 | .956 | .771 | .795 | .920 | .712 | .854 | .800 | .795 | .600 | .625 | .375 | .734 | .956 |

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-davis-s
Site Code : 1
Start Date : 1/26/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

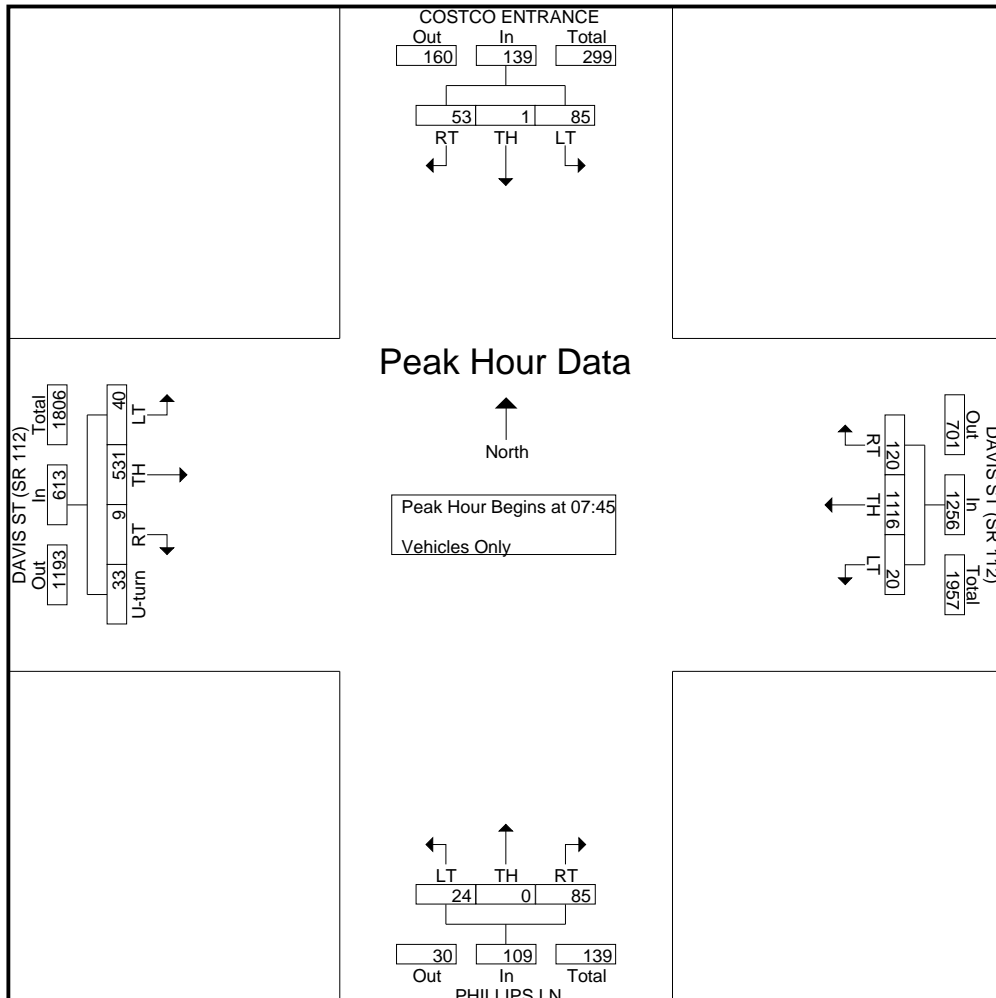
File Name : phillips-davis-a
Site Code : 2
Start Date : 1/15/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | COSTCO ENTRANCE Southbound | | | | DAVIS ST (SR 112) Westbound | | | | PHILLIPS LN Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | | Int. Total |
|--------------------|-------------------------------|----------|------------|------------|--------------------------------|-------------|-----------|-------------|---------------------------|----------|-----------|------------|--------------------------------|-------------|-----------|-----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| 07:00 | 9 | 0 | 18 | 27 | 16 | 173 | 4 | 193 | 14 | 0 | 8 | 22 | 1 | 99 | 5 | 6 | 111 | 353 |
| 07:15 | 9 | 0 | 18 | 27 | 25 | 246 | 3 | 274 | 17 | 1 | 7 | 25 | 1 | 110 | 6 | 1 | 118 | 444 |
| 07:30 | 14 | 0 | 19 | 33 | 21 | 254 | 4 | 279 | 16 | 2 | 3 | 21 | 0 | 139 | 8 | 4 | 151 | 484 |
| 07:45 | 12 | 0 | 13 | 25 | 35 | 349 | 5 | 389 | 20 | 0 | 4 | 24 | 3 | 133 | 10 | 7 | 153 | 591 |
| Total | 44 | 0 | 68 | 112 | 97 | 1022 | 16 | 1135 | 67 | 3 | 22 | 92 | 5 | 481 | 29 | 18 | 533 | 1872 |
| 08:00 | 10 | 0 | 27 | 37 | 23 | 260 | 5 | 288 | 24 | 0 | 5 | 29 | 1 | 128 | 14 | 11 | 154 | 508 |
| 08:15 | 17 | 0 | 24 | 41 | 30 | 272 | 5 | 307 | 22 | 0 | 8 | 30 | 1 | 136 | 9 | 6 | 152 | 530 |
| 08:30 | 14 | 1 | 21 | 36 | 32 | 235 | 5 | 272 | 19 | 0 | 7 | 26 | 4 | 134 | 7 | 9 | 154 | 488 |
| 08:45 | 16 | 0 | 21 | 37 | 27 | 237 | 15 | 279 | 19 | 2 | 8 | 29 | 5 | 153 | 10 | 5 | 173 | 518 |
| Total | 57 | 1 | 93 | 151 | 112 | 1004 | 30 | 1146 | 84 | 2 | 28 | 114 | 11 | 551 | 40 | 31 | 633 | 2044 |
| Grand Total | 101 | 1 | 161 | 263 | 209 | 2026 | 46 | 2281 | 151 | 5 | 50 | 206 | 16 | 1032 | 69 | 49 | 1166 | 3916 |
| Apprch % | 38.4 | 0.4 | 61.2 | | 9.2 | 88.8 | 2 | | 73.3 | 2.4 | 24.3 | | 1.4 | 88.5 | 5.9 | 4.2 | | |
| Total % | 2.6 | 0 | 4.1 | 6.7 | 5.3 | 51.7 | 1.2 | 58.2 | 3.9 | 0.1 | 1.3 | 5.3 | 0.4 | 26.4 | 1.8 | 1.3 | 29.8 | |

| Start Time | COSTCO ENTRANCE Southbound | | | | DAVIS ST (SR 112) Westbound | | | | PHILLIPS LN Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | | Int. Total |
|---------------------|-------------------------------|----------|-----------|------------|--------------------------------|-------------|-----------|-------------|---------------------------|----------|-----------|------------|--------------------------------|------------|-----------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| 07:45 | 12 | 0 | 13 | 25 | 35 | 349 | 5 | 389 | 20 | 0 | 4 | 24 | 3 | 133 | 10 | 7 | 153 | 591 |
| 08:00 | 10 | 0 | 27 | 37 | 23 | 260 | 5 | 288 | 24 | 0 | 5 | 29 | 1 | 128 | 14 | 11 | 154 | 508 |
| 08:15 | 17 | 0 | 24 | 41 | 30 | 272 | 5 | 307 | 22 | 0 | 8 | 30 | 1 | 136 | 9 | 6 | 152 | 530 |
| 08:30 | 14 | 1 | 21 | 36 | 32 | 235 | 5 | 272 | 19 | 0 | 7 | 26 | 4 | 134 | 7 | 9 | 154 | 488 |
| Total Volume | 53 | 1 | 85 | 139 | 120 | 1116 | 20 | 1256 | 85 | 0 | 24 | 109 | 9 | 531 | 40 | 33 | 613 | 2117 |
| % App. Total | 38.1 | 0.7 | 61.2 | | 9.6 | 88.9 | 1.6 | | 78 | 0 | 22 | | 1.5 | 86.6 | 6.5 | 5.4 | | |
| PHF | .779 | .250 | .787 | .848 | .857 | .799 | 1.00 | .807 | .885 | .000 | .750 | .908 | .563 | .976 | .714 | .750 | .995 | .896 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:45



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

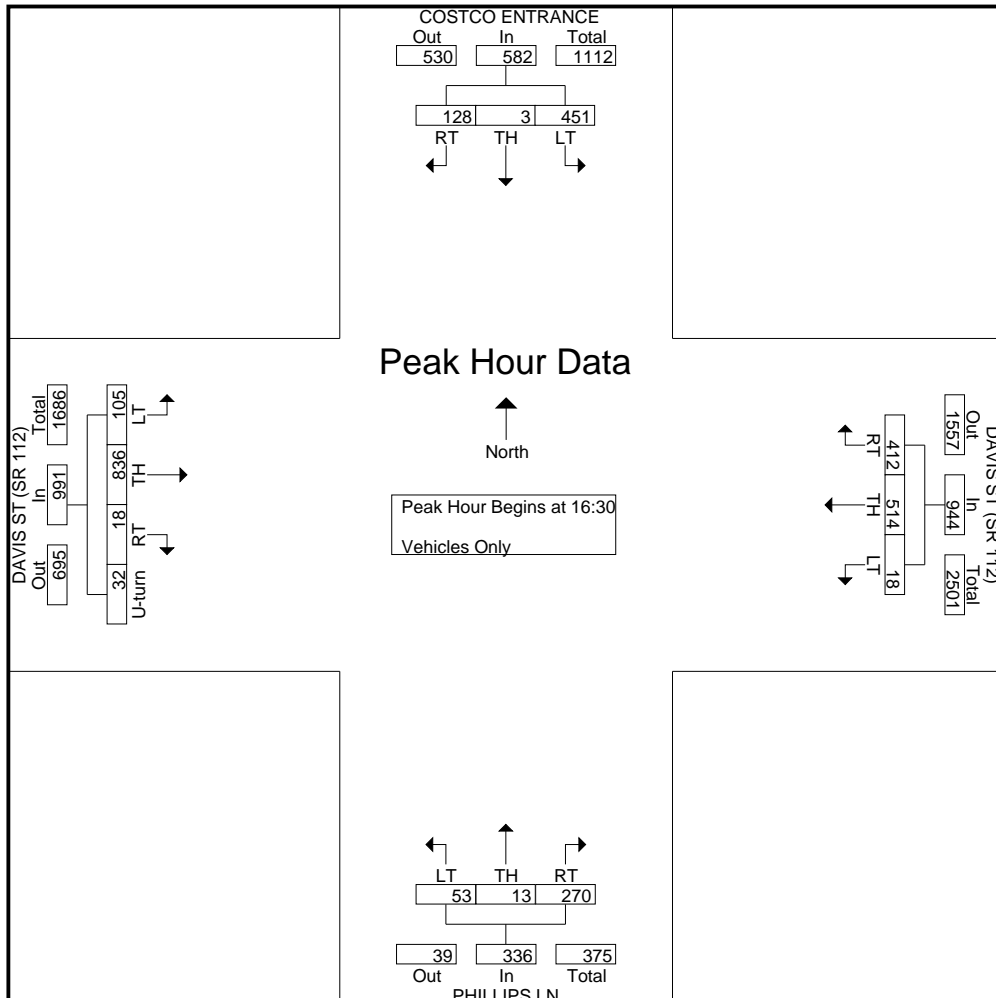
File Name : phillips-davis-p
Site Code : 2
Start Date : 1/15/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | COSTCO ENTRANCE Southbound | | | | DAVIS ST (SR 112) Westbound | | | | PHILLIPS LN. Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | | Int. Total |
|--------------------|-------------------------------|-----------|------------|-------------|--------------------------------|------------|-----------|-------------|----------------------------|-----------|------------|------------|--------------------------------|-------------|------------|-----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| 16:00 | 30 | 2 | 92 | 124 | 97 | 118 | 12 | 227 | 64 | 1 | 16 | 81 | 4 | 192 | 32 | 7 | 235 | 667 |
| 16:15 | 23 | 2 | 115 | 140 | 105 | 127 | 11 | 243 | 61 | 2 | 9 | 72 | 2 | 197 | 20 | 7 | 226 | 681 |
| 16:30 | 27 | 0 | 106 | 133 | 85 | 131 | 7 | 223 | 88 | 4 | 17 | 109 | 5 | 209 | 21 | 6 | 241 | 706 |
| 16:45 | 32 | 2 | 127 | 161 | 112 | 130 | 7 | 249 | 59 | 3 | 11 | 73 | 4 | 198 | 29 | 9 | 240 | 723 |
| Total | 112 | 6 | 440 | 558 | 399 | 506 | 37 | 942 | 272 | 10 | 53 | 335 | 15 | 796 | 102 | 29 | 942 | 2777 |
| 17:00 | 35 | 0 | 120 | 155 | 101 | 111 | 3 | 215 | 63 | 3 | 17 | 83 | 5 | 222 | 26 | 8 | 261 | 714 |
| 17:15 | 34 | 1 | 98 | 133 | 114 | 142 | 1 | 257 | 60 | 3 | 8 | 71 | 4 | 207 | 29 | 9 | 249 | 710 |
| 17:30 | 19 | 0 | 108 | 127 | 122 | 113 | 7 | 242 | 81 | 0 | 13 | 94 | 10 | 193 | 28 | 5 | 236 | 699 |
| 17:45 | 37 | 3 | 108 | 148 | 118 | 127 | 4 | 249 | 58 | 0 | 20 | 78 | 3 | 159 | 36 | 5 | 203 | 678 |
| Total | 125 | 4 | 434 | 563 | 455 | 493 | 15 | 963 | 262 | 6 | 58 | 326 | 22 | 781 | 119 | 27 | 949 | 2801 |
| Grand Total | 237 | 10 | 874 | 1121 | 854 | 999 | 52 | 1905 | 534 | 16 | 111 | 661 | 37 | 1577 | 221 | 56 | 1891 | 5578 |
| Apprch % | 21.1 | 0.9 | 78 | | 44.8 | 52.4 | 2.7 | | 80.8 | 2.4 | 16.8 | | 2 | 83.4 | 11.7 | 3 | | |
| Total % | 4.2 | 0.2 | 15.7 | 20.1 | 15.3 | 17.9 | 0.9 | 34.2 | 9.6 | 0.3 | 2 | 11.9 | 0.7 | 28.3 | 4 | 1 | 33.9 | |

| Start Time | COSTCO ENTRANCE Southbound | | | | DAVIS ST (SR 112) Westbound | | | | PHILLIPS LN. Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | | Int. Total |
|---------------------|-------------------------------|----------|------------|------------|--------------------------------|------------|-----------|------------|----------------------------|-----------|-----------|------------|--------------------------------|------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| 16:30 | 27 | 0 | 106 | 133 | 85 | 131 | 7 | 223 | 88 | 4 | 17 | 109 | 5 | 209 | 21 | 6 | 241 | 706 |
| 16:45 | 32 | 2 | 127 | 161 | 112 | 130 | 7 | 249 | 59 | 3 | 11 | 73 | 4 | 198 | 29 | 9 | 240 | 723 |
| 17:00 | 35 | 0 | 120 | 155 | 101 | 111 | 3 | 215 | 63 | 3 | 17 | 83 | 5 | 222 | 26 | 8 | 261 | 714 |
| 17:15 | 34 | 1 | 98 | 133 | 114 | 142 | 1 | 257 | 60 | 3 | 8 | 71 | 4 | 207 | 29 | 9 | 249 | 710 |
| Total Volume | 128 | 3 | 451 | 582 | 412 | 514 | 18 | 944 | 270 | 13 | 53 | 336 | 18 | 836 | 105 | 32 | 991 | 2853 |
| % App. Total | 22 | 0.5 | 77.5 | | 43.6 | 54.4 | 1.9 | | 80.4 | 3.9 | 15.8 | | 1.8 | 84.4 | 10.6 | 3.2 | | |
| PHF | .914 | .375 | .888 | .904 | .904 | .905 | .643 | .918 | .767 | .813 | .779 | .771 | .900 | .941 | .905 | .889 | .949 | .987 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : phillips-davis-s
Site Code : 2
Start Date : 1/12/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | COSTCO ENTRANCE Southbound | | | | DAVIS ST Westbound | | | | PHILLIPS LN Northbound | | | | DAVIS ST Eastbound | | | | | Int. Total |
|-------------|-------------------------------|-----|------|------------|-----------------------|------|-----|------------|---------------------------|-----|-----|------------|-----------------------|------|------|--------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| 10:00 | 19 | 2 | 78 | 99 | 113 | 109 | 1 | 223 | 36 | 0 | 10 | 46 | 2 | 74 | 33 | 7 | 116 | 484 |
| 10:15 | 25 | 1 | 78 | 104 | 163 | 139 | 3 | 305 | 43 | 1 | 3 | 47 | 3 | 92 | 18 | 7 | 120 | 576 |
| 10:30 | 21 | 4 | 104 | 129 | 146 | 128 | 4 | 278 | 38 | 0 | 1 | 39 | 1 | 97 | 27 | 8 | 133 | 579 |
| 10:45 | 32 | 2 | 87 | 121 | 141 | 126 | 5 | 272 | 47 | 3 | 11 | 61 | 1 | 90 | 30 | 3 | 124 | 578 |
| Total | 97 | 9 | 347 | 453 | 563 | 502 | 13 | 1078 | 164 | 4 | 25 | 193 | 7 | 353 | 108 | 25 | 493 | 2217 |
| 11:00 | 24 | 0 | 106 | 130 | 173 | 138 | 1 | 312 | 48 | 2 | 9 | 59 | 2 | 82 | 26 | 4 | 114 | 615 |
| 11:15 | 33 | 2 | 106 | 141 | 167 | 137 | 2 | 306 | 64 | 0 | 9 | 73 | 3 | 111 | 38 | 6 | 158 | 678 |
| 11:30 | 36 | 2 | 131 | 169 | 153 | 136 | 5 | 294 | 61 | 4 | 8 | 73 | 0 | 99 | 30 | 5 | 134 | 670 |
| 11:45 | 34 | 2 | 108 | 144 | 161 | 127 | 7 | 295 | 49 | 2 | 13 | 64 | 1 | 118 | 27 | 6 | 152 | 655 |
| Total | 127 | 6 | 451 | 584 | 654 | 538 | 15 | 1207 | 222 | 8 | 39 | 269 | 6 | 410 | 121 | 21 | 558 | 2618 |
| 12:00 | 23 | 2 | 149 | 174 | 169 | 124 | 2 | 295 | 49 | 0 | 8 | 57 | 1 | 125 | 29 | 9 | 164 | 690 |
| 12:15 | 27 | 0 | 128 | 155 | 180 | 114 | 3 | 297 | 47 | 4 | 13 | 64 | 4 | 130 | 29 | 4 | 167 | 683 |
| 12:30 | 26 | 3 | 133 | 162 | 157 | 137 | 5 | 299 | 46 | 1 | 12 | 59 | 3 | 145 | 30 | 7 | 185 | 705 |
| 12:45 | 23 | 1 | 141 | 165 | 164 | 128 | 7 | 299 | 47 | 2 | 18 | 67 | 6 | 103 | 28 | 5 | 142 | 673 |
| Total | 99 | 6 | 551 | 656 | 670 | 503 | 17 | 1190 | 189 | 7 | 51 | 247 | 14 | 503 | 116 | 25 | 658 | 2751 |
| 13:00 | 32 | 0 | 164 | 196 | 153 | 116 | 5 | 274 | 47 | 1 | 10 | 58 | 2 | 104 | 27 | 8 | 141 | 669 |
| 13:15 | 34 | 4 | 134 | 172 | 163 | 126 | 3 | 292 | 63 | 2 | 12 | 77 | 6 | 118 | 27 | 7 | 158 | 699 |
| 13:30 | 34 | 1 | 152 | 187 | 170 | 119 | 1 | 290 | 55 | 5 | 8 | 68 | 2 | 96 | 19 | 4 | 121 | 666 |
| 13:45 | 38 | 1 | 128 | 167 | 177 | 112 | 7 | 296 | 56 | 2 | 12 | 70 | 2 | 111 | 36 | 5 | 154 | 687 |
| Total | 138 | 6 | 578 | 722 | 663 | 473 | 16 | 1152 | 221 | 10 | 42 | 273 | 12 | 429 | 109 | 24 | 574 | 2721 |
| Grand Total | 461 | 27 | 1927 | 2415 | 2550 | 2016 | 61 | 4627 | 796 | 29 | 157 | 982 | 39 | 1695 | 454 | 95 | 2283 | 10307 |
| Apprch % | 19.1 | 1.1 | 79.8 | | 55.1 | 43.6 | 1.3 | | 81.1 | 3 | 16 | | 1.7 | 74.2 | 19.9 | 4.2 | | |
| Total % | 4.5 | 0.3 | 18.7 | 23.4 | 24.7 | 19.6 | 0.6 | 44.9 | 7.7 | 0.3 | 1.5 | 9.5 | 0.4 | 16.4 | 4.4 | 0.9 | 22.1 | |

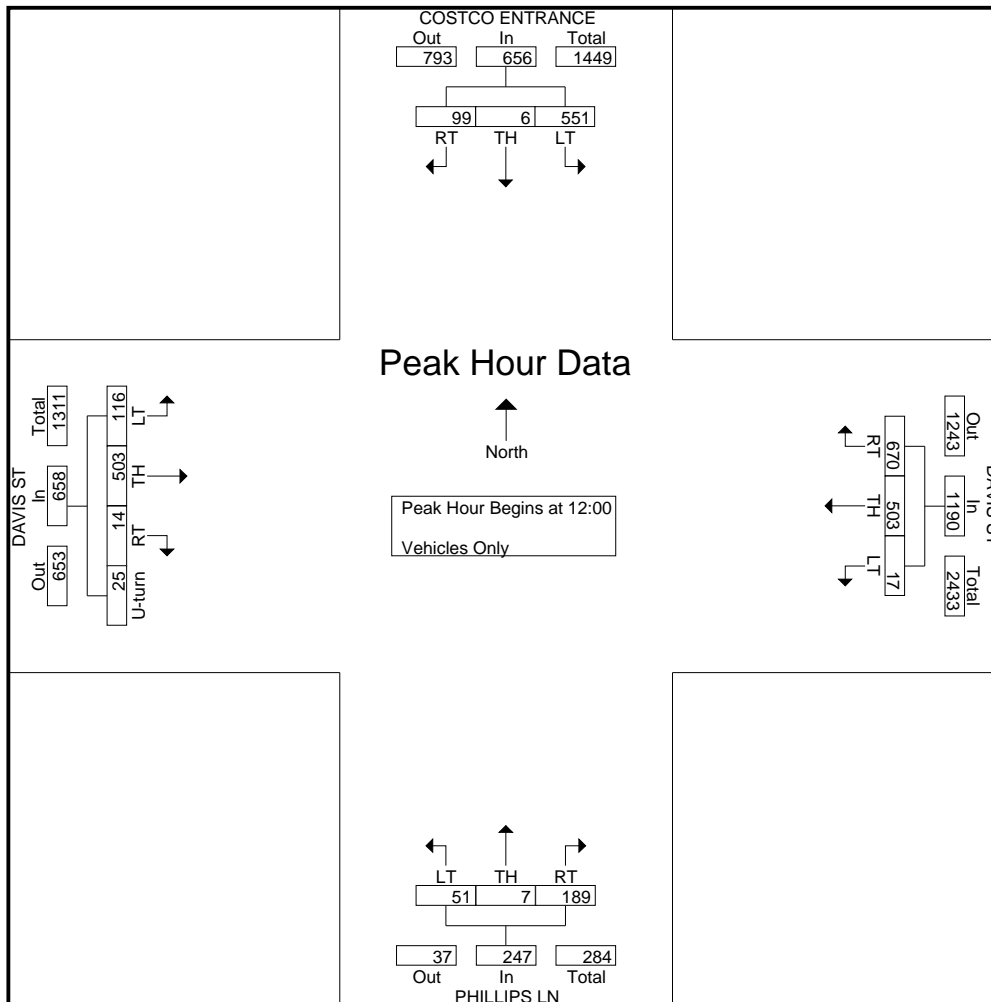
| Start Time | COSTCO ENTRANCE Southbound | | | | DAVIS ST Westbound | | | | PHILLIPS LN Northbound | | | | DAVIS ST Eastbound | | | | | Int. Total |
|--|-------------------------------|----------|------------|------------|-----------------------|------------|----------|------------|---------------------------|----------|-----------|------------|-----------------------|------------|-----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:00 | | | | | | | | | | | | | | | | | | |
| 12:00 | 23 | 2 | 149 | 174 | 169 | 124 | 2 | 295 | 49 | 0 | 8 | 57 | 1 | 125 | 29 | 9 | 164 | 690 |
| 12:15 | 27 | 0 | 128 | 155 | 180 | 114 | 3 | 297 | 47 | 4 | 13 | 64 | 4 | 130 | 29 | 4 | 167 | 683 |
| 12:30 | 26 | 3 | 133 | 162 | 157 | 137 | 5 | 299 | 46 | 1 | 12 | 59 | 3 | 145 | 30 | 7 | 185 | 705 |
| 12:45 | 23 | 1 | 141 | 165 | 164 | 128 | 7 | 299 | 47 | 2 | 18 | 67 | 6 | 103 | 28 | 5 | 142 | 673 |
| Total Volume | 99 | 6 | 551 | 656 | 670 | 503 | 17 | 1190 | 189 | 7 | 51 | 247 | 14 | 503 | 116 | 25 | 658 | 2751 |
| % App. Total | 15.1 | 0.9 | 84 | | 56.3 | 42.3 | 1.4 | | 76.5 | 2.8 | 20.6 | | 2.1 | 76.4 | 17.6 | 3.8 | | |
| PHF | .917 | .500 | .924 | .943 | .931 | .918 | .607 | .995 | .964 | .438 | .708 | .922 | .583 | .867 | .967 | .694 | .889 | .976 |

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : phillips-davis-s
Site Code : 2
Start Date : 1/12/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

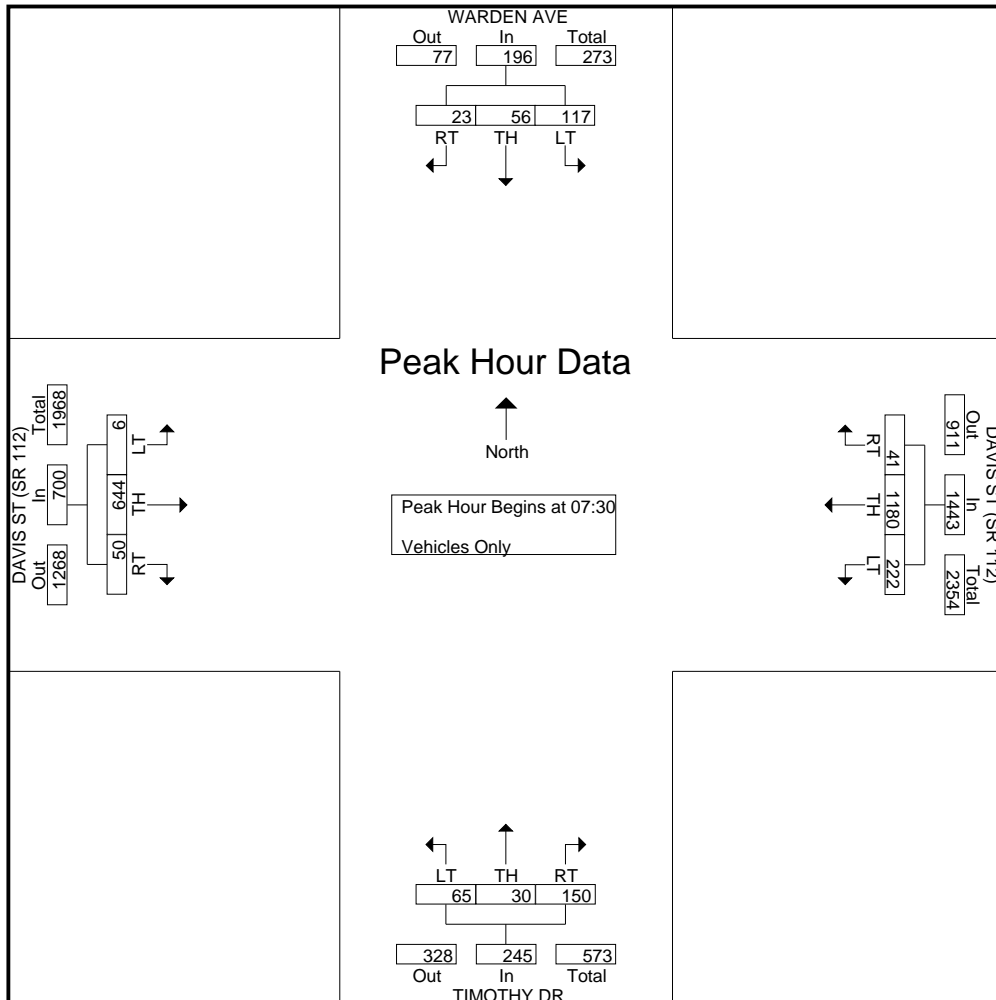
File Name : warden-davis-a
Site Code : 3
Start Date : 1/15/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | WARDEN AVE Southbound | | | | DAVIS ST (SR 112) Westbound | | | | TIMOTHY DR Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|--------------------|--------------------------|-----------|------------|------------|--------------------------------|-------------|------------|-------------|--------------------------|-----------|------------|------------|--------------------------------|-------------|-----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 3 | 5 | 24 | 32 | 8 | 185 | 43 | 236 | 23 | 3 | 7 | 33 | 8 | 120 | 1 | 129 | 430 |
| 07:15 | 6 | 4 | 19 | 29 | 8 | 260 | 48 | 316 | 32 | 5 | 10 | 47 | 14 | 127 | 2 | 143 | 535 |
| 07:30 | 5 | 7 | 32 | 44 | 6 | 268 | 45 | 319 | 40 | 3 | 14 | 57 | 12 | 162 | 2 | 176 | 596 |
| 07:45 | 8 | 19 | 43 | 70 | 6 | 350 | 48 | 404 | 30 | 5 | 17 | 52 | 10 | 154 | 1 | 165 | 691 |
| Total | 22 | 35 | 118 | 175 | 28 | 1063 | 184 | 1275 | 125 | 16 | 48 | 189 | 44 | 563 | 6 | 613 | 2252 |
| 08:00 | 4 | 23 | 22 | 49 | 7 | 291 | 68 | 366 | 41 | 10 | 16 | 67 | 13 | 157 | 1 | 171 | 653 |
| 08:15 | 6 | 7 | 20 | 33 | 22 | 271 | 61 | 354 | 39 | 12 | 18 | 69 | 15 | 171 | 2 | 188 | 644 |
| 08:30 | 3 | 3 | 17 | 23 | 4 | 260 | 54 | 318 | 49 | 3 | 17 | 69 | 23 | 155 | 1 | 179 | 589 |
| 08:45 | 4 | 9 | 12 | 25 | 13 | 263 | 70 | 346 | 47 | 1 | 15 | 63 | 24 | 168 | 1 | 193 | 627 |
| Total | 17 | 42 | 71 | 130 | 46 | 1085 | 253 | 1384 | 176 | 26 | 66 | 268 | 75 | 651 | 5 | 731 | 2513 |
| Grand Total | 39 | 77 | 189 | 305 | 74 | 2148 | 437 | 2659 | 301 | 42 | 114 | 457 | 119 | 1214 | 11 | 1344 | 4765 |
| Apprch % | 12.8 | 25.2 | 62 | | 2.8 | 80.8 | 16.4 | | 65.9 | 9.2 | 24.9 | | 8.9 | 90.3 | 0.8 | | |
| Total % | 0.8 | 1.6 | 4 | 6.4 | 1.6 | 45.1 | 9.2 | 55.8 | 6.3 | 0.9 | 2.4 | 9.6 | 2.5 | 25.5 | 0.2 | 28.2 | |

| Start Time | WARDEN AVE Southbound | | | | DAVIS ST (SR 112) Westbound | | | | TIMOTHY DR Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|---------------------|--------------------------|-----------|------------|------------|--------------------------------|-------------|------------|-------------|--------------------------|-----------|-----------|------------|--------------------------------|------------|----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 5 | 7 | 32 | 44 | 6 | 268 | 45 | 319 | 40 | 3 | 14 | 57 | 12 | 162 | 2 | 176 | 596 |
| 07:45 | 8 | 19 | 43 | 70 | 6 | 350 | 48 | 404 | 30 | 5 | 17 | 52 | 10 | 154 | 1 | 165 | 691 |
| 08:00 | 4 | 23 | 22 | 49 | 7 | 291 | 68 | 366 | 41 | 10 | 16 | 67 | 13 | 157 | 1 | 171 | 653 |
| 08:15 | 6 | 7 | 20 | 33 | 22 | 271 | 61 | 354 | 39 | 12 | 18 | 69 | 15 | 171 | 2 | 188 | 644 |
| Total Volume | 23 | 56 | 117 | 196 | 41 | 1180 | 222 | 1443 | 150 | 30 | 65 | 245 | 50 | 644 | 6 | 700 | 2584 |
| % App. Total | 11.7 | 28.6 | 59.7 | | 2.8 | 81.8 | 15.4 | | 61.2 | 12.2 | 26.5 | | 7.1 | 92 | 0.9 | | |
| PHF | .719 | .609 | .680 | .700 | .466 | .843 | .816 | .893 | .915 | .625 | .903 | .888 | .833 | .942 | .750 | .931 | .935 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

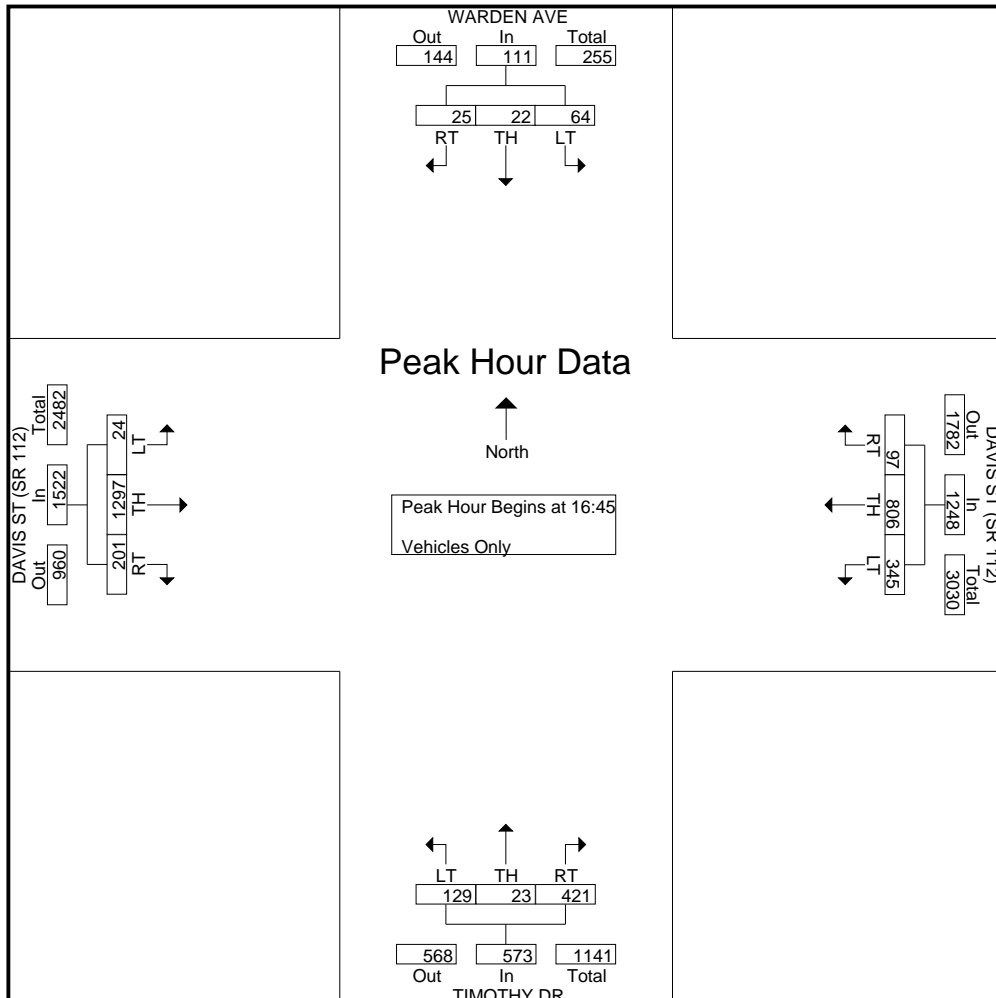
File Name : warden-davis-p
Site Code : 3
Start Date : 1/15/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | WARDEN AVE Southbound | | | | DAVIS ST (SR 112) Westbound | | | | TIMOTHY DR Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|--------------------|--------------------------|-----------|------------|------------|--------------------------------|-------------|------------|-------------|--------------------------|-----------|------------|-------------|--------------------------------|-------------|-----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 4 | 6 | 9 | 19 | 28 | 212 | 82 | 322 | 105 | 6 | 28 | 139 | 59 | 305 | 6 | 370 | 850 |
| 16:15 | 5 | 3 | 13 | 21 | 23 | 220 | 93 | 336 | 111 | 5 | 23 | 139 | 56 | 296 | 7 | 359 | 855 |
| 16:30 | 2 | 3 | 7 | 12 | 18 | 193 | 91 | 302 | 104 | 9 | 30 | 143 | 43 | 366 | 3 | 412 | 869 |
| 16:45 | 6 | 5 | 12 | 23 | 21 | 201 | 84 | 306 | 110 | 6 | 39 | 155 | 47 | 320 | 6 | 373 | 857 |
| Total | 17 | 17 | 41 | 75 | 90 | 826 | 350 | 1266 | 430 | 26 | 120 | 576 | 205 | 1287 | 22 | 1514 | 3431 |
| 17:00 | 6 | 7 | 9 | 22 | 19 | 184 | 63 | 266 | 95 | 7 | 26 | 128 | 51 | 367 | 4 | 422 | 838 |
| 17:15 | 5 | 3 | 23 | 31 | 23 | 206 | 94 | 323 | 91 | 4 | 39 | 134 | 44 | 317 | 7 | 368 | 856 |
| 17:30 | 8 | 7 | 20 | 35 | 34 | 215 | 104 | 353 | 125 | 6 | 25 | 156 | 59 | 293 | 7 | 359 | 903 |
| 17:45 | 4 | 5 | 13 | 22 | 22 | 226 | 96 | 344 | 104 | 10 | 26 | 140 | 51 | 282 | 5 | 338 | 844 |
| Total | 23 | 22 | 65 | 110 | 98 | 831 | 357 | 1286 | 415 | 27 | 116 | 558 | 205 | 1259 | 23 | 1487 | 3441 |
| Grand Total | 40 | 39 | 106 | 185 | 188 | 1657 | 707 | 2552 | 845 | 53 | 236 | 1134 | 410 | 2546 | 45 | 3001 | 6872 |
| Apprch % | 21.6 | 21.1 | 57.3 | | 7.4 | 64.9 | 27.7 | | 74.5 | 4.7 | 20.8 | | 13.7 | 84.8 | 1.5 | | |
| Total % | 0.6 | 0.6 | 1.5 | 2.7 | 2.7 | 24.1 | 10.3 | 37.1 | 12.3 | 0.8 | 3.4 | 16.5 | 6 | 37 | 0.7 | 43.7 | |

| Start Time | WARDEN AVE Southbound | | | | DAVIS ST (SR 112) Westbound | | | | TIMOTHY DR Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|---------------------|--------------------------|-----------|-----------|------------|--------------------------------|------------|------------|-------------|--------------------------|-----------|------------|------------|--------------------------------|-------------|-----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:45 | 6 | 5 | 12 | 23 | 21 | 201 | 84 | 306 | 110 | 6 | 39 | 155 | 47 | 320 | 6 | 373 | 857 |
| 17:00 | 6 | 7 | 9 | 22 | 19 | 184 | 63 | 266 | 95 | 7 | 26 | 128 | 51 | 367 | 4 | 422 | 838 |
| 17:15 | 5 | 3 | 23 | 31 | 23 | 206 | 94 | 323 | 91 | 4 | 39 | 134 | 44 | 317 | 7 | 368 | 856 |
| 17:30 | 8 | 7 | 20 | 35 | 34 | 215 | 104 | 353 | 125 | 6 | 25 | 156 | 59 | 293 | 7 | 359 | 903 |
| Total Volume | 25 | 22 | 64 | 111 | 97 | 806 | 345 | 1248 | 421 | 23 | 129 | 573 | 201 | 1297 | 24 | 1522 | 3454 |
| % App. Total | 22.5 | 19.8 | 57.7 | | 7.8 | 64.6 | 27.6 | | 73.5 | 4 | 22.5 | | 13.2 | 85.2 | 1.6 | | |
| PHF | .781 | .786 | .696 | .793 | .713 | .937 | .829 | .884 | .842 | .821 | .827 | .918 | .852 | .884 | .857 | .902 | .956 |

Peak Hour Analysis From 16:00 to 17:30 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:45



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : warden-davis-s
Site Code : 3
Start Date : 1/12/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | WARDEN AV Southbound | | | | DAVIS ST Westbound | | | | TIMOTHY DR Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|--------------------|-------------------------|-----------|------------|------------|-----------------------|-------------|-------------|-------------|--------------------------|-----------|------------|-------------|-----------------------|-------------|-----------|-------------|--------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 6 | 7 | 18 | 31 | 7 | 206 | 75 | 288 | 68 | 6 | 27 | 101 | 26 | 162 | 2 | 190 | 610 |
| 10:15 | 11 | 5 | 14 | 30 | 12 | 245 | 106 | 363 | 78 | 1 | 38 | 117 | 39 | 165 | 3 | 207 | 717 |
| 10:30 | 6 | 2 | 18 | 26 | 17 | 253 | 94 | 364 | 77 | 6 | 21 | 104 | 47 | 192 | 1 | 240 | 734 |
| 10:45 | 3 | 6 | 25 | 34 | 15 | 241 | 92 | 348 | 101 | 4 | 26 | 131 | 37 | 191 | 2 | 230 | 743 |
| Total | 26 | 20 | 75 | 121 | 51 | 945 | 367 | 1363 | 324 | 17 | 112 | 453 | 149 | 710 | 8 | 867 | 2804 |
| 11:00 | 5 | 5 | 13 | 23 | 14 | 283 | 113 | 410 | 93 | 3 | 32 | 128 | 36 | 202 | 2 | 240 | 801 |
| 11:15 | 3 | 4 | 14 | 21 | 7 | 259 | 104 | 370 | 98 | 6 | 38 | 142 | 36 | 242 | 6 | 284 | 817 |
| 11:30 | 5 | 5 | 17 | 27 | 12 | 257 | 123 | 392 | 109 | 3 | 35 | 147 | 43 | 248 | 2 | 293 | 859 |
| 11:45 | 1 | 9 | 16 | 26 | 13 | 255 | 102 | 370 | 119 | 4 | 37 | 160 | 30 | 240 | 2 | 272 | 828 |
| Total | 14 | 23 | 60 | 97 | 46 | 1054 | 442 | 1542 | 419 | 16 | 142 | 577 | 145 | 932 | 12 | 1089 | 3305 |
| 12:00 | 2 | 7 | 17 | 26 | 16 | 241 | 118 | 375 | 113 | 1 | 48 | 162 | 49 | 273 | 2 | 324 | 887 |
| 12:15 | 3 | 6 | 21 | 30 | 16 | 245 | 125 | 386 | 118 | 5 | 36 | 159 | 54 | 252 | 2 | 308 | 883 |
| 12:30 | 7 | 4 | 12 | 23 | 16 | 271 | 140 | 427 | 123 | 3 | 33 | 159 | 43 | 281 | 3 | 327 | 936 |
| 12:45 | 4 | 3 | 12 | 19 | 14 | 264 | 122 | 400 | 110 | 1 | 39 | 150 | 47 | 231 | 3 | 281 | 850 |
| Total | 16 | 20 | 62 | 98 | 62 | 1021 | 505 | 1588 | 464 | 10 | 156 | 630 | 193 | 1037 | 10 | 1240 | 3556 |
| 13:00 | 6 | 4 | 11 | 21 | 10 | 231 | 114 | 355 | 127 | 3 | 32 | 162 | 38 | 283 | 4 | 325 | 863 |
| 13:15 | 5 | 4 | 10 | 19 | 16 | 249 | 129 | 394 | 142 | 11 | 35 | 188 | 52 | 254 | 6 | 312 | 913 |
| 13:30 | 2 | 7 | 10 | 19 | 13 | 258 | 157 | 428 | 108 | 3 | 33 | 144 | 44 | 257 | 6 | 307 | 898 |
| 13:45 | 3 | 6 | 5 | 14 | 17 | 256 | 133 | 406 | 133 | 12 | 37 | 182 | 45 | 245 | 3 | 293 | 895 |
| Total | 16 | 21 | 36 | 73 | 56 | 994 | 533 | 1583 | 510 | 29 | 137 | 676 | 179 | 1039 | 19 | 1237 | 3569 |
| Grand Total | 72 | 84 | 233 | 389 | 215 | 4014 | 1847 | 6076 | 1717 | 72 | 547 | 2336 | 666 | 3718 | 49 | 4433 | 13234 |
| Apprch % | 18.5 | 21.6 | 59.9 | | 3.5 | 66.1 | 30.4 | | 73.5 | 3.1 | 23.4 | | 15 | 83.9 | 1.1 | | |
| Total % | 0.5 | 0.6 | 1.8 | 2.9 | 1.6 | 30.3 | 14 | 45.9 | 13 | 0.5 | 4.1 | 17.7 | 5 | 28.1 | 0.4 | 33.5 | |

| Start Time | WARDEN AV Southbound | | | | DAVIS ST Westbound | | | | TIMOTHY DR Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|---------------------|-------------------------|----------|-----------|------------|-----------------------|------------|------------|------------|--------------------------|-----------|-----------|------------|-----------------------|------------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 13:00 | 6 | 4 | 11 | 21 | 10 | 231 | 114 | 355 | 127 | 3 | 32 | 162 | 38 | 283 | 4 | 325 | 863 |
| 13:15 | 5 | 4 | 10 | 19 | 16 | 249 | 129 | 394 | 142 | 11 | 35 | 188 | 52 | 254 | 6 | 312 | 913 |
| 13:30 | 2 | 7 | 10 | 19 | 13 | 258 | 157 | 428 | 108 | 3 | 33 | 144 | 44 | 257 | 6 | 307 | 898 |
| 13:45 | 3 | 6 | 5 | 14 | 17 | 256 | 133 | 406 | 133 | 12 | 37 | 182 | 45 | 245 | 3 | 293 | 895 |
| Total Volume | 16 | 21 | 36 | 73 | 56 | 994 | 533 | 1583 | 510 | 29 | 137 | 676 | 179 | 1039 | 19 | 1237 | 3569 |
| % App. Total | 21.9 | 28.8 | 49.3 | | 3.5 | 62.8 | 33.7 | | 75.4 | 4.3 | 20.3 | | 14.5 | 84 | 1.5 | | |
| PHF | .667 | .750 | .818 | .869 | .824 | .963 | .849 | .925 | .898 | .604 | .926 | .899 | .861 | .918 | .792 | .952 | .977 |

Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1

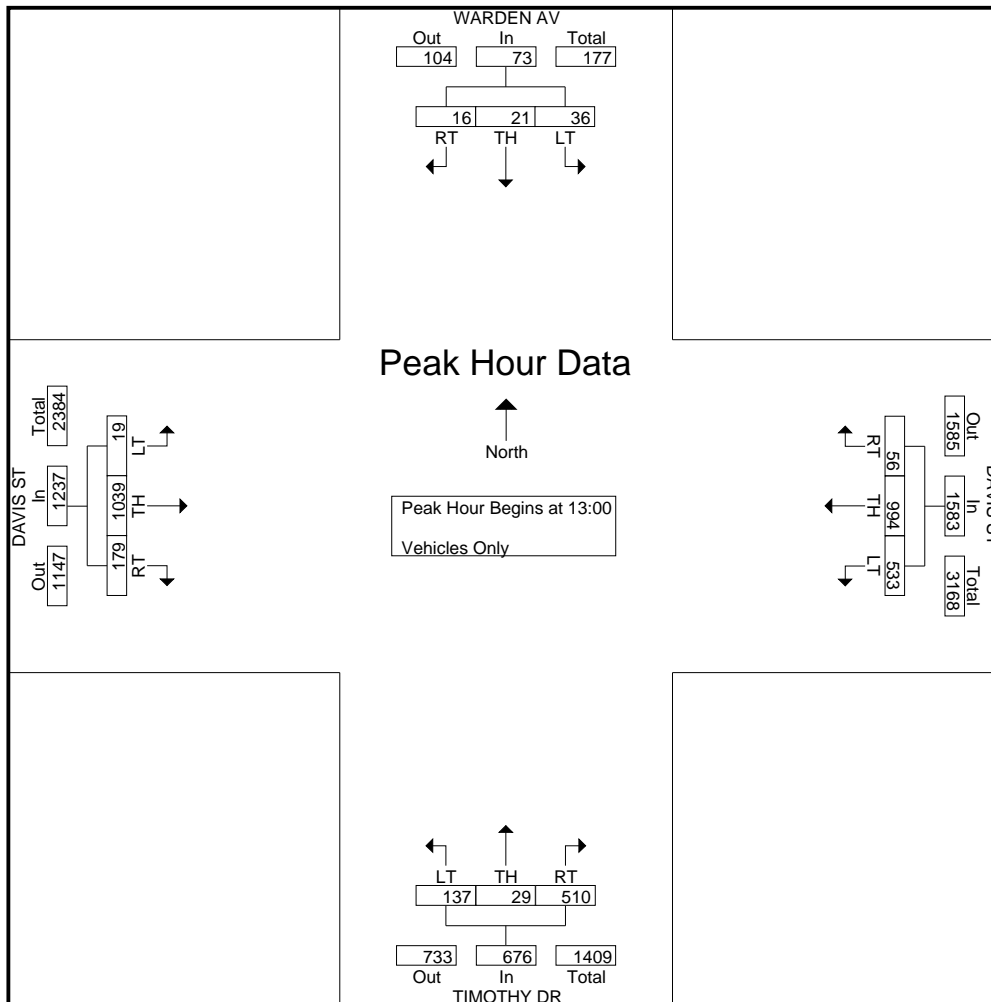
Peak Hour for Entire Intersection Begins at 13:00

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : warden-davis-s
Site Code : 3
Start Date : 1/12/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

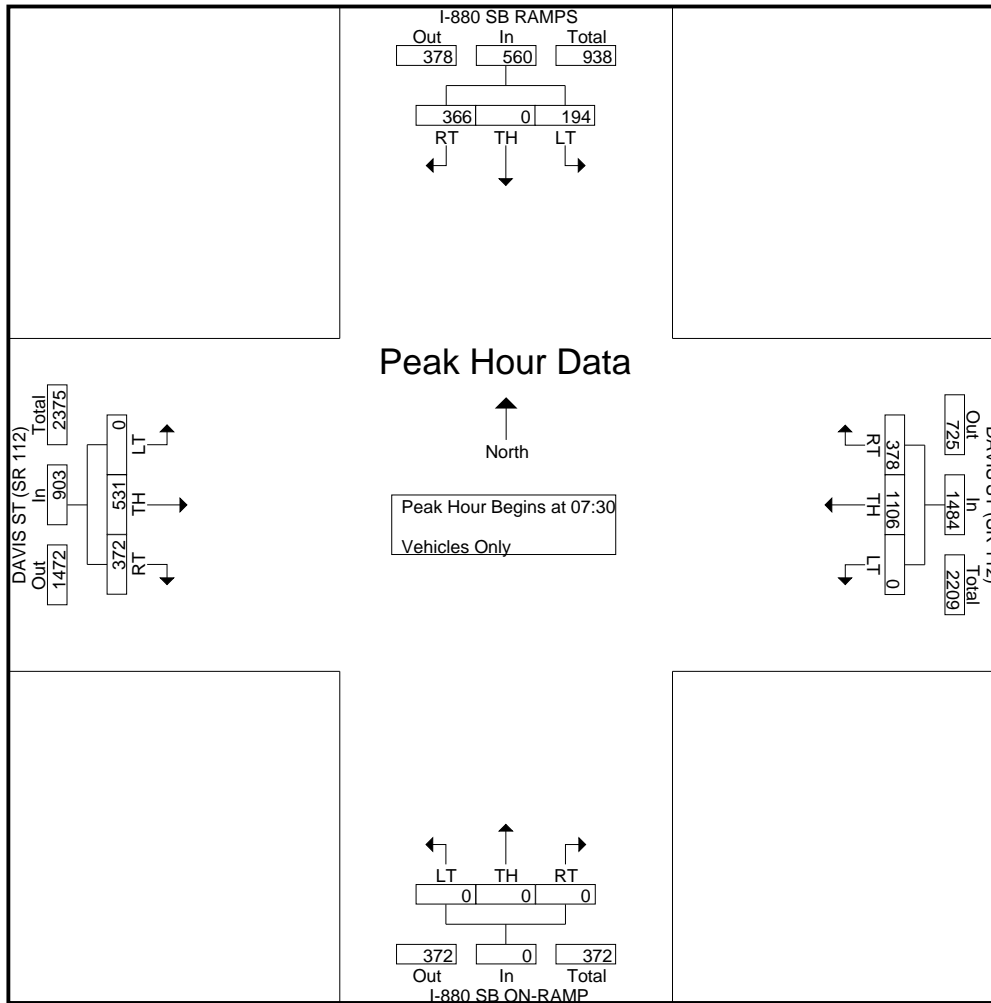
File Name : 880sb-davis-a
Site Code : 4
Start Date : 1/15/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 SB RAMPS Southbound | | | | DAVIS ST (SR 112) Westbound | | | | I-880 SB ON-RAMP Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|--------------------|------------------------------|----------|------------|-------------|--------------------------------|-------------|----------|-------------|--------------------------------|----------|----------|------------|--------------------------------|-------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 72 | 0 | 27 | 99 | 94 | 165 | 0 | 259 | 0 | 0 | 0 | 0 | 65 | 103 | 0 | 168 | 526 |
| 07:15 | 72 | 0 | 41 | 113 | 87 | 238 | 0 | 325 | 0 | 0 | 0 | 0 | 72 | 109 | 0 | 181 | 619 |
| 07:30 | 86 | 0 | 39 | 125 | 110 | 242 | 0 | 352 | 0 | 0 | 0 | 0 | 101 | 129 | 0 | 230 | 707 |
| 07:45 | 94 | 0 | 50 | 144 | 81 | 311 | 0 | 392 | 0 | 0 | 0 | 0 | 97 | 131 | 0 | 228 | 764 |
| Total | 324 | 0 | 157 | 481 | 372 | 956 | 0 | 1328 | 0 | 0 | 0 | 0 | 335 | 472 | 0 | 807 | 2616 |
| 08:00 | 87 | 0 | 40 | 127 | 102 | 274 | 0 | 376 | 0 | 0 | 0 | 0 | 87 | 133 | 0 | 220 | 723 |
| 08:15 | 99 | 0 | 65 | 164 | 85 | 279 | 0 | 364 | 0 | 0 | 0 | 0 | 87 | 138 | 0 | 225 | 753 |
| 08:30 | 62 | 0 | 48 | 110 | 70 | 233 | 0 | 303 | 0 | 0 | 0 | 0 | 99 | 122 | 0 | 221 | 634 |
| 08:45 | 102 | 0 | 59 | 161 | 80 | 263 | 0 | 343 | 0 | 0 | 0 | 0 | 94 | 135 | 0 | 229 | 733 |
| Total | 350 | 0 | 212 | 562 | 337 | 1049 | 0 | 1386 | 0 | 0 | 0 | 0 | 367 | 528 | 0 | 895 | 2843 |
| Grand Total | 674 | 0 | 369 | 1043 | 709 | 2005 | 0 | 2714 | 0 | 0 | 0 | 0 | 702 | 1000 | 0 | 1702 | 5459 |
| Apprch % | 64.6 | 0 | 35.4 | | 26.1 | 73.9 | 0 | | 0 | 0 | 0 | 0 | 41.2 | 58.8 | 0 | | |
| Total % | 12.3 | 0 | 6.8 | 19.1 | 13 | 36.7 | 0 | 49.7 | 0 | 0 | 0 | 0 | 12.9 | 18.3 | 0 | 31.2 | |

| Start Time | I-880 SB RAMPS Southbound | | | | DAVIS ST (SR 112) Westbound | | | | I-880 SB ON-RAMP Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|--------------|------------------------------|------|-----------|------------|--------------------------------|------------|------|------------|--------------------------------|------|------|------------|--------------------------------|------------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 86 | 0 | 39 | 125 | 110 | 242 | 0 | 352 | 0 | 0 | 0 | 0 | 101 | 129 | 0 | 230 | 707 |
| 07:45 | 94 | 0 | 50 | 144 | 81 | 311 | 0 | 392 | 0 | 0 | 0 | 0 | 97 | 131 | 0 | 228 | 764 |
| 08:00 | 87 | 0 | 40 | 127 | 102 | 274 | 0 | 376 | 0 | 0 | 0 | 0 | 87 | 133 | 0 | 220 | 723 |
| 08:15 | 99 | 0 | 65 | 164 | 85 | 279 | 0 | 364 | 0 | 0 | 0 | 0 | 87 | 138 | 0 | 225 | 753 |
| Total Volume | 366 | 0 | 194 | 560 | 378 | 1106 | 0 | 1484 | 0 | 0 | 0 | 0 | 372 | 531 | 0 | 903 | 2947 |
| % App. Total | 65.4 | 0 | 34.6 | | 25.5 | 74.5 | 0 | | 0 | 0 | 0 | 0 | 41.2 | 58.8 | 0 | | |
| PHF | .924 | .000 | .746 | .854 | .859 | .889 | .000 | .946 | .000 | .000 | .000 | .000 | .921 | .962 | .000 | .982 | .964 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

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916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

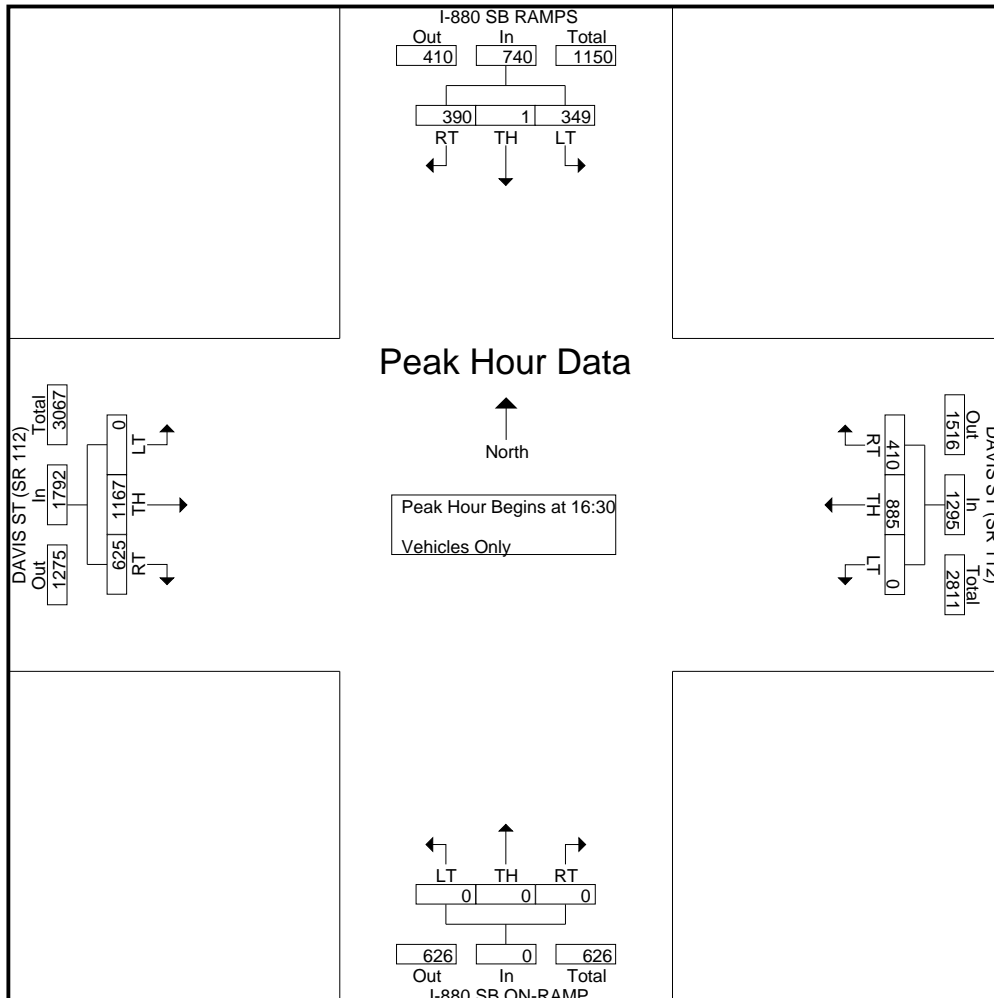
File Name : 880sb-davis-p
Site Code : 4
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 SB RAMPS Southbound | | | | DAVIS ST (SR 112) Westbound | | | | I-880 SB ON-RAMP Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|--------------------|------------------------------|----------|------------|-------------|--------------------------------|-------------|----------|-------------|--------------------------------|----------|----------|------------|--------------------------------|-------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 103 | 0 | 76 | 179 | 97 | 259 | 0 | 356 | 0 | 0 | 0 | 0 | 152 | 285 | 0 | 437 | 972 |
| 16:15 | 119 | 0 | 107 | 226 | 89 | 203 | 0 | 292 | 0 | 0 | 0 | 0 | 155 | 220 | 0 | 375 | 893 |
| 16:30 | 107 | 1 | 100 | 208 | 104 | 206 | 0 | 310 | 0 | 0 | 0 | 0 | 167 | 280 | 0 | 447 | 965 |
| 16:45 | 98 | 0 | 71 | 169 | 89 | 224 | 0 | 313 | 0 | 0 | 0 | 0 | 157 | 309 | 0 | 466 | 948 |
| Total | 427 | 1 | 354 | 782 | 379 | 892 | 0 | 1271 | 0 | 0 | 0 | 0 | 631 | 1094 | 0 | 1725 | 3778 |
| 17:00 | 103 | 0 | 84 | 187 | 111 | 222 | 0 | 333 | 0 | 0 | 0 | 0 | 163 | 265 | 0 | 428 | 948 |
| 17:15 | 82 | 0 | 94 | 176 | 106 | 233 | 0 | 339 | 0 | 0 | 0 | 0 | 138 | 313 | 0 | 451 | 966 |
| 17:30 | 105 | 0 | 104 | 209 | 102 | 202 | 0 | 304 | 0 | 0 | 0 | 0 | 119 | 265 | 0 | 384 | 897 |
| 17:45 | 83 | 1 | 98 | 182 | 89 | 231 | 0 | 320 | 0 | 0 | 0 | 0 | 134 | 284 | 0 | 418 | 920 |
| Total | 373 | 1 | 380 | 754 | 408 | 888 | 0 | 1296 | 0 | 0 | 0 | 0 | 554 | 1127 | 0 | 1681 | 3731 |
| Grand Total | 800 | 2 | 734 | 1536 | 787 | 1780 | 0 | 2567 | 0 | 0 | 0 | 0 | 1185 | 2221 | 0 | 3406 | 7509 |
| Apprch % | 52.1 | 0.1 | 47.8 | | 30.7 | 69.3 | 0 | | 0 | 0 | 0 | | 34.8 | 65.2 | 0 | | |
| Total % | 10.7 | 0 | 9.8 | 20.5 | 10.5 | 23.7 | 0 | 34.2 | 0 | 0 | 0 | | 15.8 | 29.6 | 0 | 45.4 | |

| Start Time | I-880 SB RAMPS Southbound | | | | DAVIS ST (SR 112) Westbound | | | | I-880 SB ON-RAMP Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|--------------|------------------------------|----------|------------|------------|--------------------------------|------------|------|------------|--------------------------------|------|------|------------|--------------------------------|------------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:30 | 107 | 1 | 100 | 208 | 104 | 206 | 0 | 310 | 0 | 0 | 0 | 0 | 167 | 280 | 0 | 447 | 965 |
| 16:45 | 98 | 0 | 71 | 169 | 89 | 224 | 0 | 313 | 0 | 0 | 0 | 0 | 157 | 309 | 0 | 466 | 948 |
| 17:00 | 103 | 0 | 84 | 187 | 111 | 222 | 0 | 333 | 0 | 0 | 0 | 0 | 163 | 265 | 0 | 428 | 948 |
| 17:15 | 82 | 0 | 94 | 176 | 106 | 233 | 0 | 339 | 0 | 0 | 0 | 0 | 138 | 313 | 0 | 451 | 966 |
| Total Volume | 390 | 1 | 349 | 740 | 410 | 885 | 0 | 1295 | 0 | 0 | 0 | 0 | 625 | 1167 | 0 | 1792 | 3827 |
| % App. Total | 52.7 | 0.1 | 47.2 | | 31.7 | 68.3 | 0 | | 0 | 0 | 0 | | 34.9 | 65.1 | 0 | | |
| PHF | .911 | .250 | .873 | .889 | .923 | .950 | .000 | .955 | .000 | .000 | .000 | .000 | .936 | .932 | .000 | .961 | .990 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880sb-davis-s
Site Code : 4
Start Date : 1/12/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 SB RAMPS Southbound | | | | DAVIS ST Westbound | | | | I-880 SB ON-RAMP Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|--------------------|------------------------------|----------|-------------|-------------|-----------------------|-------------|----------|-------------|--------------------------------|----------|----------|------------|-----------------------|-------------|----------|-------------|--------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 93 | 0 | 57 | 150 | 100 | 201 | 0 | 301 | 0 | 0 | 0 | 0 | 70 | 177 | 0 | 247 | 698 |
| 10:15 | 132 | 0 | 58 | 190 | 66 | 233 | 0 | 299 | 0 | 0 | 0 | 0 | 95 | 158 | 0 | 253 | 742 |
| 10:30 | 94 | 0 | 60 | 154 | 90 | 260 | 0 | 350 | 0 | 0 | 0 | 0 | 117 | 172 | 0 | 289 | 793 |
| 10:45 | 108 | 0 | 66 | 174 | 93 | 230 | 0 | 323 | 0 | 0 | 0 | 0 | 101 | 203 | 0 | 304 | 801 |
| Total | 427 | 0 | 241 | 668 | 349 | 924 | 0 | 1273 | 0 | 0 | 0 | 0 | 383 | 710 | 0 | 1093 | 3034 |
| 11:00 | 128 | 0 | 45 | 173 | 83 | 258 | 0 | 341 | 0 | 0 | 0 | 0 | 113 | 204 | 0 | 317 | 831 |
| 11:15 | 118 | 0 | 63 | 181 | 70 | 256 | 0 | 326 | 0 | 0 | 0 | 0 | 105 | 242 | 0 | 347 | 854 |
| 11:30 | 116 | 0 | 70 | 186 | 79 | 270 | 0 | 349 | 0 | 0 | 0 | 0 | 129 | 248 | 0 | 377 | 912 |
| 11:45 | 135 | 0 | 85 | 220 | 91 | 229 | 0 | 320 | 0 | 0 | 0 | 0 | 120 | 247 | 0 | 367 | 907 |
| Total | 497 | 0 | 263 | 760 | 323 | 1013 | 0 | 1336 | 0 | 0 | 0 | 0 | 467 | 941 | 0 | 1408 | 3504 |
| 12:00 | 138 | 0 | 73 | 211 | 94 | 250 | 0 | 344 | 0 | 0 | 0 | 0 | 142 | 258 | 0 | 400 | 955 |
| 12:15 | 143 | 0 | 84 | 227 | 91 | 235 | 0 | 326 | 0 | 0 | 0 | 0 | 129 | 263 | 0 | 392 | 945 |
| 12:30 | 143 | 0 | 85 | 228 | 71 | 281 | 0 | 352 | 0 | 0 | 0 | 0 | 135 | 274 | 0 | 409 | 989 |
| 12:45 | 151 | 0 | 70 | 221 | 113 | 254 | 0 | 367 | 0 | 0 | 0 | 0 | 109 | 248 | 0 | 357 | 945 |
| Total | 575 | 0 | 312 | 887 | 369 | 1020 | 0 | 1389 | 0 | 0 | 0 | 0 | 515 | 1043 | 0 | 1558 | 3834 |
| 13:00 | 112 | 0 | 80 | 192 | 95 | 246 | 0 | 341 | 0 | 0 | 0 | 0 | 133 | 289 | 0 | 422 | 955 |
| 13:15 | 150 | 0 | 72 | 222 | 97 | 246 | 0 | 343 | 0 | 0 | 0 | 0 | 131 | 266 | 0 | 397 | 962 |
| 13:30 | 138 | 0 | 66 | 204 | 93 | 282 | 0 | 375 | 0 | 0 | 0 | 0 | 137 | 243 | 0 | 380 | 959 |
| 13:45 | 155 | 0 | 102 | 257 | 93 | 247 | 0 | 340 | 0 | 0 | 0 | 0 | 152 | 228 | 0 | 380 | 977 |
| Total | 555 | 0 | 320 | 875 | 378 | 1021 | 0 | 1399 | 0 | 0 | 0 | 0 | 553 | 1026 | 0 | 1579 | 3853 |
| Grand Total | 2054 | 0 | 1136 | 3190 | 1419 | 3978 | 0 | 5397 | 0 | 0 | 0 | 0 | 1918 | 3720 | 0 | 5638 | 14225 |
| Apprch % | 64.4 | 0 | 35.6 | | 26.3 | 73.7 | 0 | | 0 | 0 | 0 | 0 | 34 | 66 | 0 | | |
| Total % | 14.4 | 0 | 8 | 22.4 | 10 | 28 | 0 | 37.9 | 0 | 0 | 0 | 0 | 13.5 | 26.2 | 0 | 39.6 | |

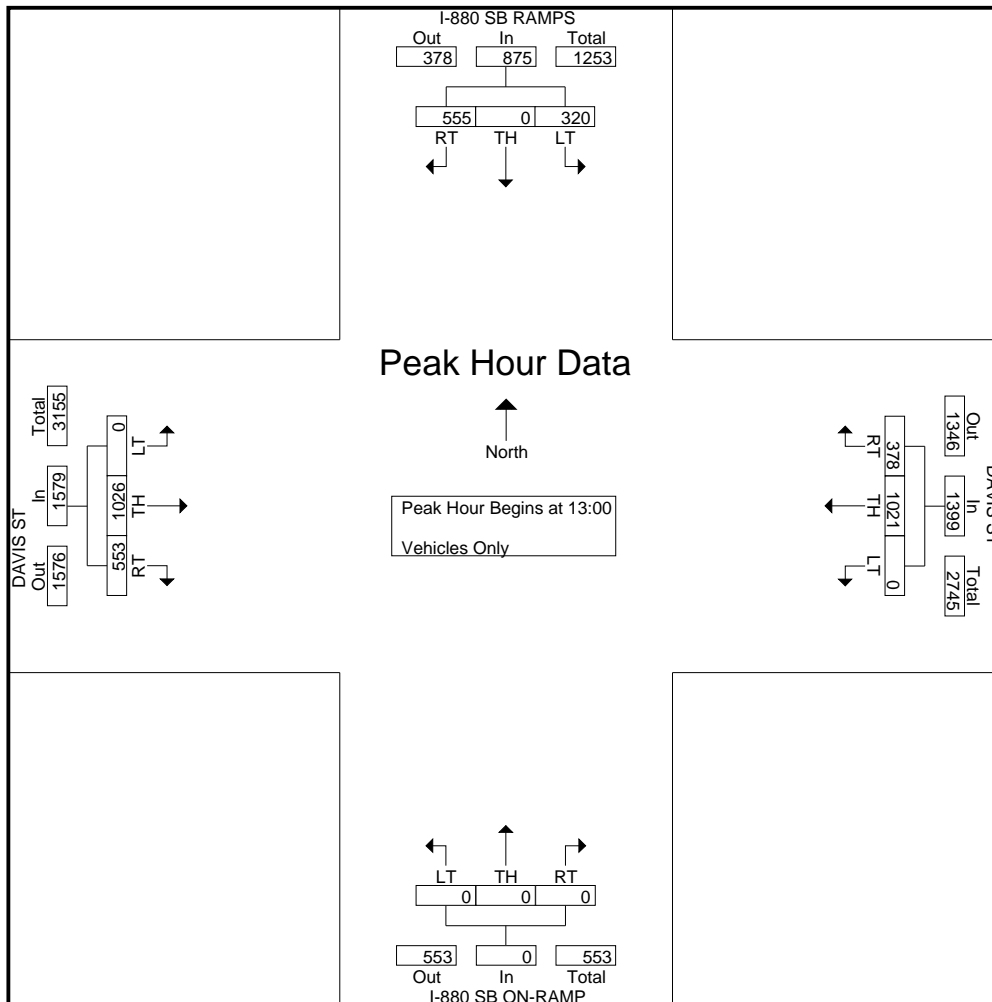
| Start Time | I-880 SB RAMPS Southbound | | | | DAVIS ST Westbound | | | | I-880 SB ON-RAMP Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|---|------------------------------|-------------|-------------|-------------|-----------------------|-------------|-------------|-------------|--------------------------------|-------------|-------------|-------------|-----------------------|-------------|-------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 13:00 | | | | | | | | | | | | | | | | | |
| 13:00 | 112 | 0 | 80 | 192 | 95 | 246 | 0 | 341 | 0 | 0 | 0 | 0 | 133 | 289 | 0 | 422 | 955 |
| 13:15 | 150 | 0 | 72 | 222 | 97 | 246 | 0 | 343 | 0 | 0 | 0 | 0 | 131 | 266 | 0 | 397 | 962 |
| 13:30 | 138 | 0 | 66 | 204 | 93 | 282 | 0 | 375 | 0 | 0 | 0 | 0 | 137 | 243 | 0 | 380 | 959 |
| 13:45 | 155 | 0 | 102 | 257 | 93 | 247 | 0 | 340 | 0 | 0 | 0 | 0 | 152 | 228 | 0 | 380 | 977 |
| Total Volume | 555 | 0 | 320 | 875 | 378 | 1021 | 0 | 1399 | 0 | 0 | 0 | 0 | 553 | 1026 | 0 | 1579 | 3853 |
| % App. Total | 63.4 | 0 | 36.6 | | 27 | 73 | 0 | | 0 | 0 | 0 | 0 | 35 | 65 | 0 | | |
| PHF | .895 | .000 | .784 | .851 | .974 | .905 | .000 | .933 | .000 | .000 | .000 | .000 | .910 | .888 | .000 | .935 | .986 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880sb-davis-s
Site Code : 4
Start Date : 1/12/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

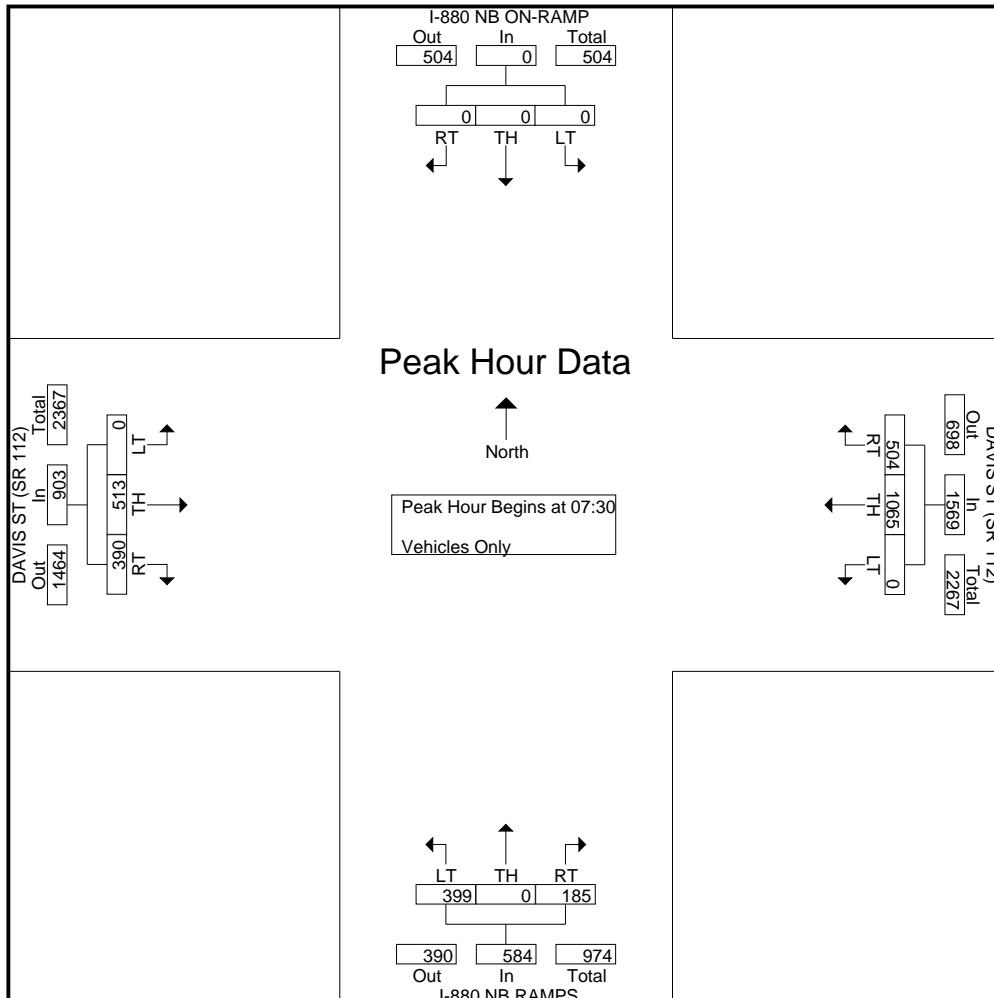
File Name : 880nb-davis-a
Site Code : 31
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 NB ON-RAMP Southbound | | | | DAVIS ST (SR 112) Westbound | | | | I-880 NB RAMPS Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|--------------------|--------------------------------|----------|----------|------------|--------------------------------|-------------|----------|-------------|------------------------------|----------|------------|-------------|--------------------------------|------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 0 | 0 | 0 | 0 | 95 | 183 | 0 | 278 | 32 | 0 | 111 | 143 | 58 | 79 | 0 | 137 | 558 |
| 07:15 | 0 | 0 | 0 | 0 | 117 | 201 | 0 | 318 | 35 | 0 | 148 | 183 | 60 | 83 | 0 | 143 | 644 |
| 07:30 | 0 | 0 | 0 | 0 | 142 | 248 | 0 | 390 | 43 | 0 | 113 | 156 | 70 | 110 | 0 | 180 | 726 |
| 07:45 | 0 | 0 | 0 | 0 | 135 | 289 | 0 | 424 | 51 | 0 | 108 | 159 | 91 | 133 | 0 | 224 | 807 |
| Total | 0 | 0 | 0 | 0 | 489 | 921 | 0 | 1410 | 161 | 0 | 480 | 641 | 279 | 405 | 0 | 684 | 2735 |
| 08:00 | 0 | 0 | 0 | 0 | 117 | 247 | 0 | 364 | 43 | 0 | 68 | 111 | 93 | 120 | 0 | 213 | 688 |
| 08:15 | 0 | 0 | 0 | 0 | 110 | 281 | 0 | 391 | 48 | 0 | 110 | 158 | 136 | 150 | 0 | 286 | 835 |
| 08:30 | 0 | 0 | 0 | 0 | 88 | 203 | 0 | 291 | 64 | 0 | 89 | 153 | 98 | 131 | 0 | 229 | 673 |
| 08:45 | 0 | 0 | 0 | 0 | 94 | 166 | 0 | 260 | 76 | 0 | 152 | 228 | 64 | 169 | 0 | 233 | 721 |
| Total | 0 | 0 | 0 | 0 | 409 | 897 | 0 | 1306 | 231 | 0 | 419 | 650 | 391 | 570 | 0 | 961 | 2917 |
| Grand Total | 0 | 0 | 0 | 0 | 898 | 1818 | 0 | 2716 | 392 | 0 | 899 | 1291 | 670 | 975 | 0 | 1645 | 5652 |
| Apprch % | 0 | 0 | 0 | 0 | 33.1 | 66.9 | 0 | 30.4 | 0 | 69.6 | 40.7 | 59.3 | 0 | 0 | 0 | 0 | |
| Total % | 0 | 0 | 0 | 0 | 15.9 | 32.2 | 0 | 48.1 | 6.9 | 0 | 15.9 | 22.8 | 11.9 | 17.3 | 0 | 29.1 | |

| Start Time | I-880 NB ON-RAMP Southbound | | | | DAVIS ST (SR 112) Westbound | | | | I-880 NB RAMPS Northbound | | | | DAVIS ST (SR 112) Eastbound | | | | Int. Total |
|--------------|--------------------------------|------|------|------------|--------------------------------|------------|------|------------|------------------------------|------|------------|------------|--------------------------------|------------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 0 | 0 | 0 | 0 | 142 | 248 | 0 | 390 | 43 | 0 | 113 | 156 | 70 | 110 | 0 | 180 | 726 |
| 07:45 | 0 | 0 | 0 | 0 | 135 | 289 | 0 | 424 | 51 | 0 | 108 | 159 | 91 | 133 | 0 | 224 | 807 |
| 08:00 | 0 | 0 | 0 | 0 | 117 | 247 | 0 | 364 | 43 | 0 | 68 | 111 | 93 | 120 | 0 | 213 | 688 |
| 08:15 | 0 | 0 | 0 | 0 | 110 | 281 | 0 | 391 | 48 | 0 | 110 | 158 | 136 | 150 | 0 | 286 | 835 |
| Total Volume | 0 | 0 | 0 | 0 | 504 | 1065 | 0 | 1569 | 185 | 0 | 399 | 584 | 390 | 513 | 0 | 903 | 3056 |
| % App. Total | 0 | 0 | 0 | 0 | 32.1 | 67.9 | 0 | 31.7 | 0 | 68.3 | 43.2 | 56.8 | 0 | 0 | 0 | 0 | |
| PHF | .000 | .000 | .000 | .000 | .887 | .921 | .000 | .925 | .907 | .000 | .883 | .918 | .717 | .855 | .000 | .789 | .915 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

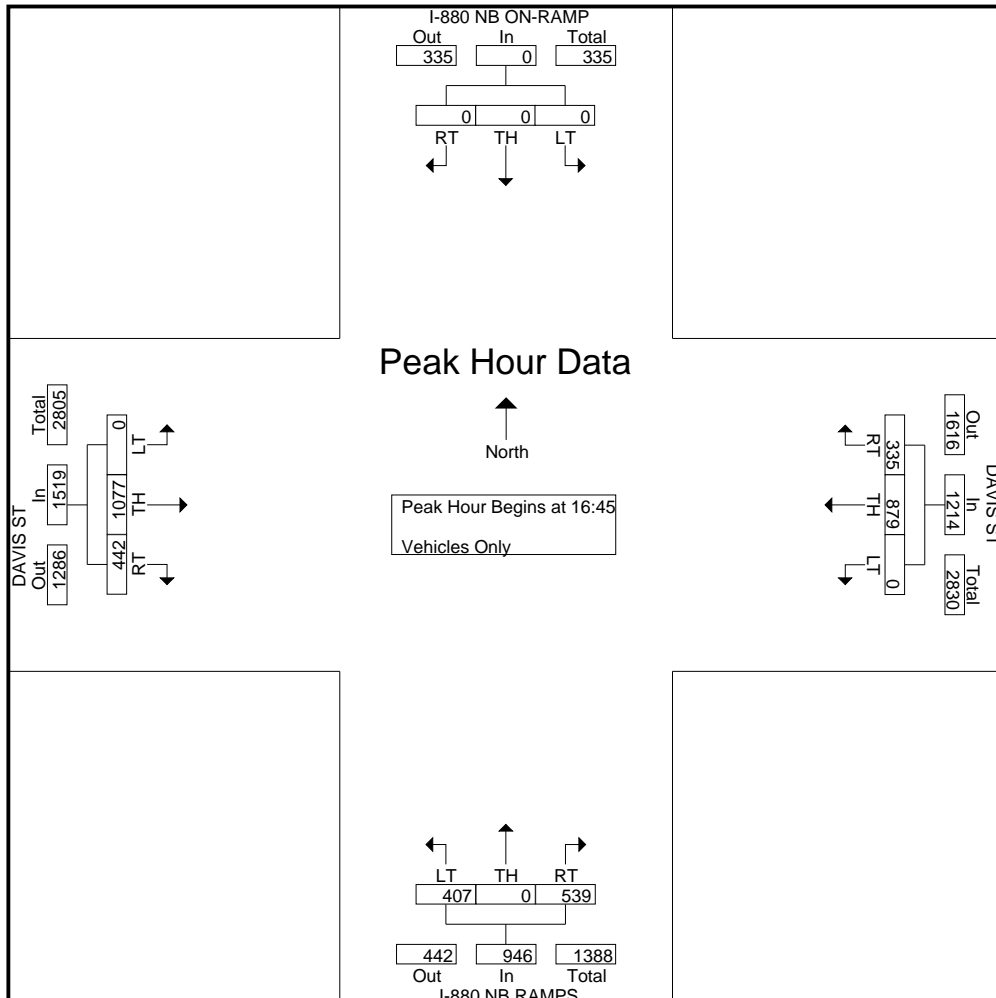
CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880nb-davis-p
Site Code : 31
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 NB ON-RAMP Southbound | | | | DAVIS ST Westbound | | | | I-880 NB RAMPS Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|--------------------|--------------------------------|----------|----------|------------|-----------------------|-------------|----------|-------------|------------------------------|----------|------------|-------------|-----------------------|-------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 0 | 0 | 0 | 0 | 77 | 222 | 0 | 299 | 139 | 0 | 112 | 251 | 109 | 249 | 0 | 358 | 908 |
| 16:15 | 0 | 0 | 0 | 0 | 98 | 195 | 0 | 293 | 124 | 0 | 111 | 235 | 99 | 230 | 0 | 329 | 857 |
| 16:30 | 0 | 0 | 0 | 0 | 64 | 210 | 0 | 274 | 132 | 0 | 104 | 236 | 103 | 279 | 0 | 382 | 892 |
| 16:45 | 0 | 0 | 0 | 0 | 89 | 193 | 0 | 282 | 137 | 0 | 117 | 254 | 108 | 277 | 0 | 385 | 921 |
| Total | 0 | 0 | 0 | 0 | 328 | 820 | 0 | 1148 | 532 | 0 | 444 | 976 | 419 | 1035 | 0 | 1454 | 3578 |
| 17:00 | 0 | 0 | 0 | 0 | 91 | 241 | 0 | 332 | 119 | 0 | 90 | 209 | 105 | 253 | 0 | 358 | 899 |
| 17:15 | 0 | 0 | 0 | 0 | 79 | 222 | 0 | 301 | 148 | 0 | 113 | 261 | 120 | 282 | 0 | 402 | 964 |
| 17:30 | 0 | 0 | 0 | 0 | 76 | 223 | 0 | 299 | 135 | 0 | 87 | 222 | 109 | 265 | 0 | 374 | 895 |
| 17:45 | 0 | 0 | 0 | 0 | 80 | 202 | 0 | 282 | 150 | 0 | 109 | 259 | 87 | 291 | 0 | 378 | 919 |
| Total | 0 | 0 | 0 | 0 | 326 | 888 | 0 | 1214 | 552 | 0 | 399 | 951 | 421 | 1091 | 0 | 1512 | 3677 |
| Grand Total | 0 | 0 | 0 | 0 | 654 | 1708 | 0 | 2362 | 1084 | 0 | 843 | 1927 | 840 | 2126 | 0 | 2966 | 7255 |
| Apprch % | 0 | 0 | 0 | 0 | 27.7 | 72.3 | 0 | 56.3 | 56.3 | 0 | 43.7 | 28.3 | 28.3 | 71.7 | 0 | 28.3 | 71.7 |
| Total % | 0 | 0 | 0 | 0 | 9 | 23.5 | 0 | 32.6 | 14.9 | 0 | 11.6 | 26.6 | 11.6 | 29.3 | 0 | 40.9 | 29.3 |

| Start Time | I-880 NB ON-RAMP Southbound | | | | DAVIS ST Westbound | | | | I-880 NB RAMPS Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|--|--------------------------------|----------|----------|------------|-----------------------|------------|----------|-------------|------------------------------|----------|------------|------------|-----------------------|-------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 16:45 | | | | | | | | | | | | | | | | | |
| 16:45 | 0 | 0 | 0 | 0 | 89 | 193 | 0 | 282 | 137 | 0 | 117 | 254 | 108 | 277 | 0 | 385 | 921 |
| 17:00 | 0 | 0 | 0 | 0 | 91 | 241 | 0 | 332 | 119 | 0 | 90 | 209 | 105 | 253 | 0 | 358 | 899 |
| 17:15 | 0 | 0 | 0 | 0 | 79 | 222 | 0 | 301 | 148 | 0 | 113 | 261 | 120 | 282 | 0 | 402 | 964 |
| 17:30 | 0 | 0 | 0 | 0 | 76 | 223 | 0 | 299 | 135 | 0 | 87 | 222 | 109 | 265 | 0 | 374 | 895 |
| Total Volume | 0 | 0 | 0 | 0 | 335 | 879 | 0 | 1214 | 539 | 0 | 407 | 946 | 442 | 1077 | 0 | 1519 | 3679 |
| % App. Total | 0 | 0 | 0 | 0 | 27.6 | 72.4 | 0 | 57 | 57 | 0 | 43 | 29.1 | 29.1 | 70.9 | 0 | 29.1 | 70.9 |
| PHF | .000 | .000 | .000 | .000 | .920 | .912 | .000 | .914 | .910 | .000 | .870 | .906 | .921 | .955 | .000 | .945 | .954 |



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880nb-davis-s
Site Code : 31
Start Date : 1/12/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 NB ON-RAMP Southbound | | | | DAVIS ST Westbound | | | | I-880 NB RAMPS Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|-------------|--------------------------------|----|----|------------|-----------------------|------|----|------------|------------------------------|----|------|------------|-----------------------|------|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 0 | 0 | 0 | 0 | 82 | 224 | 0 | 306 | 55 | 0 | 80 | 135 | 87 | 149 | 0 | 236 | 677 |
| 10:15 | 0 | 0 | 0 | 0 | 79 | 193 | 0 | 272 | 85 | 0 | 114 | 199 | 83 | 134 | 0 | 217 | 688 |
| 10:30 | 0 | 0 | 0 | 0 | 101 | 237 | 0 | 338 | 73 | 0 | 109 | 182 | 85 | 150 | 0 | 235 | 755 |
| 10:45 | 0 | 0 | 0 | 0 | 67 | 204 | 0 | 271 | 85 | 0 | 137 | 222 | 87 | 161 | 0 | 248 | 741 |
| Total | 0 | 0 | 0 | 0 | 329 | 858 | 0 | 1187 | 298 | 0 | 440 | 738 | 342 | 594 | 0 | 936 | 2861 |
| 11:00 | 0 | 0 | 0 | 0 | 67 | 235 | 0 | 302 | 68 | 0 | 115 | 183 | 83 | 167 | 0 | 250 | 735 |
| 11:15 | 0 | 0 | 0 | 0 | 60 | 230 | 0 | 290 | 83 | 0 | 109 | 192 | 114 | 204 | 0 | 318 | 800 |
| 11:30 | 0 | 0 | 0 | 0 | 73 | 239 | 0 | 312 | 71 | 0 | 115 | 186 | 106 | 201 | 0 | 307 | 805 |
| 11:45 | 0 | 0 | 0 | 0 | 75 | 202 | 0 | 277 | 92 | 0 | 125 | 217 | 119 | 221 | 0 | 340 | 834 |
| Total | 0 | 0 | 0 | 0 | 275 | 906 | 0 | 1181 | 314 | 0 | 464 | 778 | 422 | 793 | 0 | 1215 | 3174 |
| 12:00 | 0 | 0 | 0 | 0 | 86 | 241 | 0 | 327 | 114 | 0 | 110 | 224 | 111 | 215 | 0 | 326 | 877 |
| 12:15 | 0 | 0 | 0 | 0 | 70 | 212 | 0 | 282 | 108 | 0 | 110 | 218 | 115 | 235 | 0 | 350 | 850 |
| 12:30 | 0 | 0 | 0 | 0 | 74 | 228 | 0 | 302 | 110 | 0 | 128 | 238 | 112 | 244 | 0 | 356 | 896 |
| 12:45 | 0 | 0 | 0 | 0 | 69 | 256 | 0 | 325 | 93 | 0 | 109 | 202 | 105 | 216 | 0 | 321 | 848 |
| Total | 0 | 0 | 0 | 0 | 299 | 937 | 0 | 1236 | 425 | 0 | 457 | 882 | 443 | 910 | 0 | 1353 | 3471 |
| 13:00 | 0 | 0 | 0 | 0 | 59 | 235 | 0 | 294 | 95 | 0 | 98 | 193 | 128 | 241 | 0 | 369 | 856 |
| 13:15 | 0 | 0 | 0 | 0 | 59 | 227 | 0 | 286 | 82 | 0 | 119 | 201 | 134 | 209 | 0 | 343 | 830 |
| 13:30 | 0 | 0 | 0 | 0 | 49 | 251 | 0 | 300 | 112 | 0 | 122 | 234 | 107 | 200 | 0 | 307 | 841 |
| 13:45 | 0 | 0 | 0 | 0 | 68 | 235 | 0 | 303 | 113 | 0 | 116 | 229 | 110 | 227 | 0 | 337 | 869 |
| Total | 0 | 0 | 0 | 0 | 235 | 948 | 0 | 1183 | 402 | 0 | 455 | 857 | 479 | 877 | 0 | 1356 | 3396 |
| Grand Total | 0 | 0 | 0 | 0 | 1138 | 3649 | 0 | 4787 | 1439 | 0 | 1816 | 3255 | 1686 | 3174 | 0 | 4860 | 12902 |
| Apprch % | 0 | 0 | 0 | 0 | 23.8 | 76.2 | 0 | 37.1 | 44.2 | 0 | 55.8 | 25.2 | 34.7 | 65.3 | 0 | 37.7 | |
| Total % | 0 | 0 | 0 | 0 | 8.8 | 28.3 | 0 | 37.1 | 11.2 | 0 | 14.1 | 25.2 | 13.1 | 24.6 | 0 | 37.7 | |

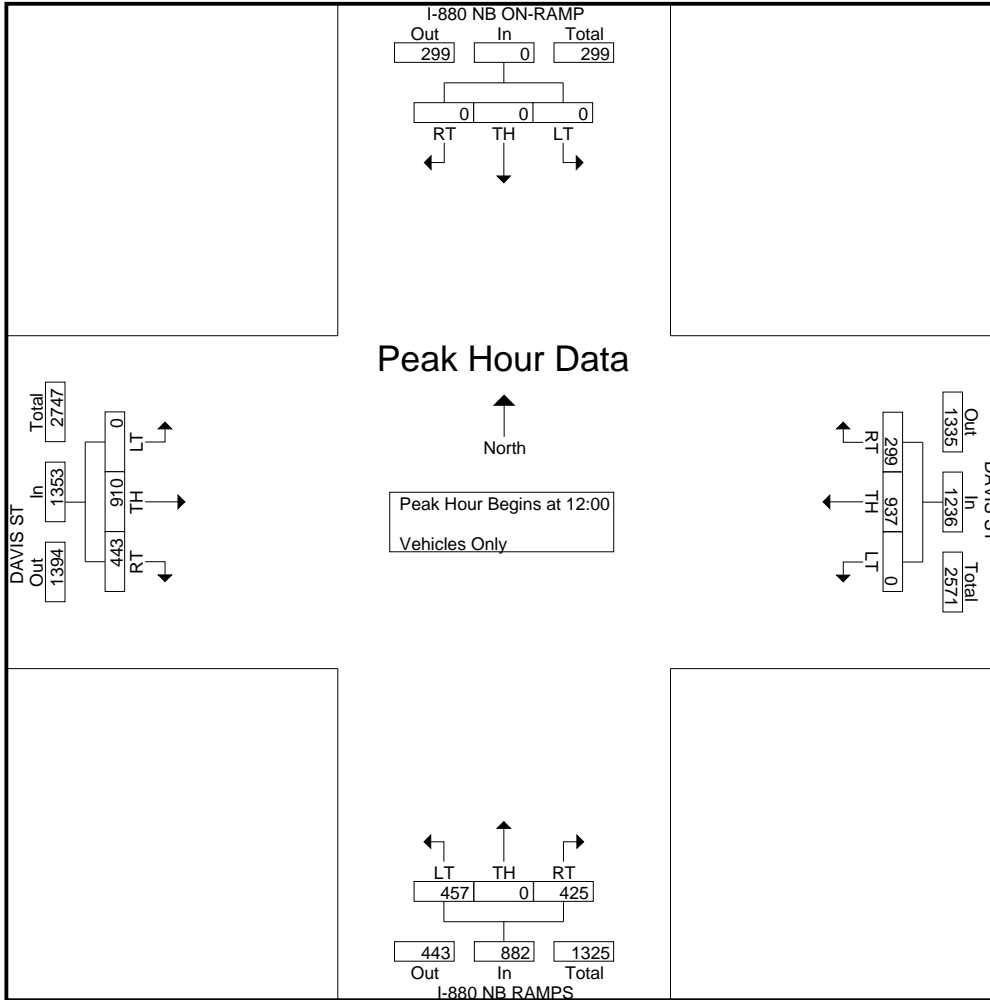
| Start Time | I-880 NB ON-RAMP Southbound | | | | DAVIS ST Westbound | | | | I-880 NB RAMPS Northbound | | | | DAVIS ST Eastbound | | | | Int. Total |
|--|--------------------------------|------|------|------------|-----------------------|------|------|------------|------------------------------|------|------|------------|-----------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:00 | | | | | | | | | | | | | | | | | |
| 12:00 | 0 | 0 | 0 | 0 | 86 | 241 | 0 | 327 | 114 | 0 | 110 | 224 | 111 | 215 | 0 | 326 | 877 |
| 12:15 | 0 | 0 | 0 | 0 | 70 | 212 | 0 | 282 | 108 | 0 | 110 | 218 | 115 | 235 | 0 | 350 | 850 |
| 12:30 | 0 | 0 | 0 | 0 | 74 | 228 | 0 | 302 | 110 | 0 | 128 | 238 | 112 | 244 | 0 | 356 | 896 |
| 12:45 | 0 | 0 | 0 | 0 | 69 | 256 | 0 | 325 | 93 | 0 | 109 | 202 | 105 | 216 | 0 | 321 | 848 |
| Total Volume | 0 | 0 | 0 | 0 | 299 | 937 | 0 | 1236 | 425 | 0 | 457 | 882 | 443 | 910 | 0 | 1353 | 3471 |
| % App. Total | 0 | 0 | 0 | 0 | 24.2 | 75.8 | 0 | 37.1 | 48.2 | 0 | 51.8 | 25.2 | 32.7 | 67.3 | 0 | 37.7 | |
| PHF | .000 | .000 | .000 | .000 | .869 | .915 | .000 | .945 | .932 | .000 | .893 | .926 | .963 | .932 | .000 | .950 | .968 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880nb-davis-s
Site Code : 31
Start Date : 1/12/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-williams-a
Site Code : 6
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

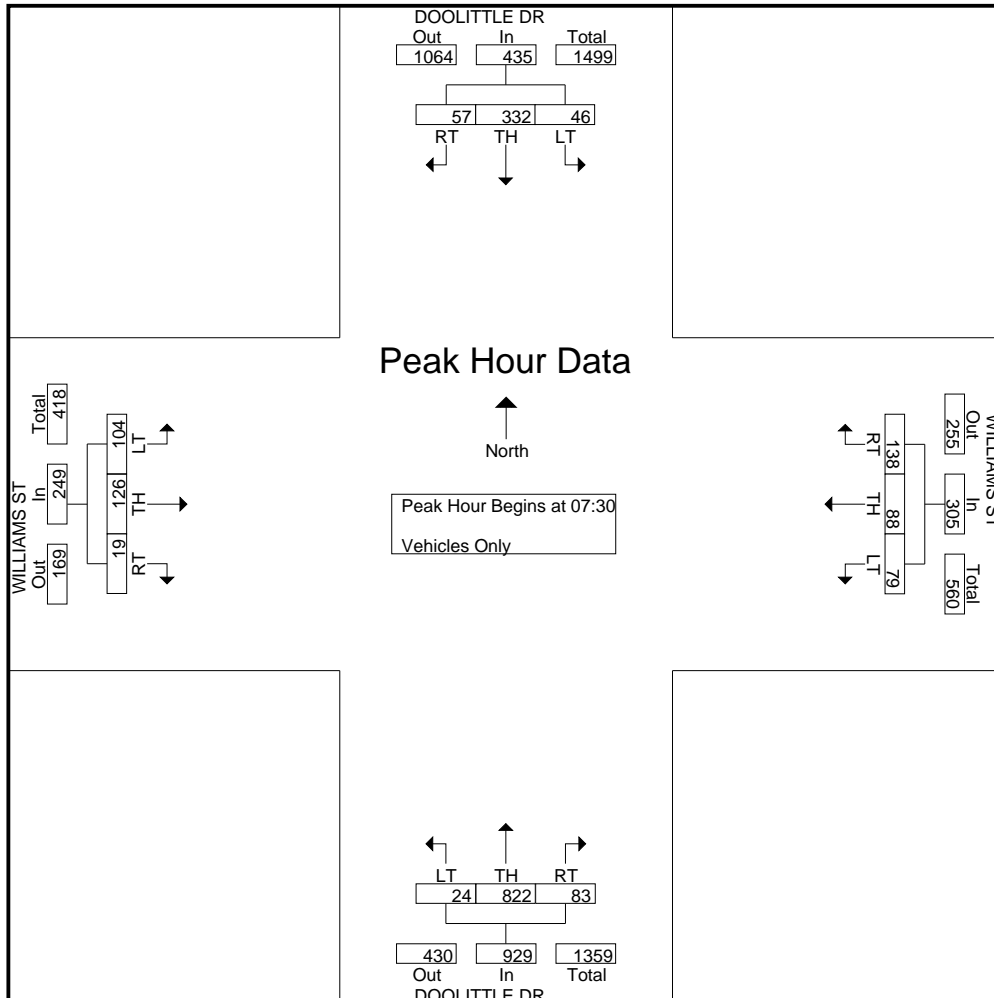
| Start Time | DOOLITTLE DR Southbound | | | | WILLIAMS ST Westbound | | | | DOOLITTLE DR Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|--------------------|----------------------------|------------|-----------|------------|--------------------------|------------|------------|------------|----------------------------|-------------|-----------|-------------|--------------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 10 | 60 | 7 | 77 | 24 | 13 | 4 | 41 | 7 | 97 | 8 | 112 | 7 | 11 | 11 | 29 | 259 |
| 07:15 | 9 | 61 | 12 | 82 | 34 | 8 | 2 | 44 | 14 | 126 | 7 | 147 | 4 | 18 | 20 | 42 | 315 |
| 07:30 | 12 | 51 | 10 | 73 | 34 | 22 | 14 | 70 | 16 | 195 | 5 | 216 | 2 | 31 | 29 | 62 | 421 |
| 07:45 | 16 | 75 | 10 | 101 | 32 | 21 | 15 | 68 | 26 | 238 | 4 | 268 | 4 | 29 | 33 | 66 | 503 |
| Total | 47 | 247 | 39 | 333 | 124 | 64 | 35 | 223 | 63 | 656 | 24 | 743 | 17 | 89 | 93 | 199 | 1498 |
| 08:00 | 21 | 99 | 18 | 138 | 34 | 19 | 23 | 76 | 30 | 195 | 8 | 233 | 10 | 52 | 17 | 79 | 526 |
| 08:15 | 8 | 107 | 8 | 123 | 38 | 26 | 27 | 91 | 11 | 194 | 7 | 212 | 3 | 14 | 25 | 42 | 468 |
| 08:30 | 6 | 90 | 15 | 111 | 33 | 13 | 20 | 66 | 18 | 130 | 7 | 155 | 9 | 16 | 19 | 44 | 376 |
| 08:45 | 11 | 83 | 14 | 108 | 20 | 19 | 11 | 50 | 12 | 150 | 8 | 170 | 1 | 8 | 14 | 23 | 351 |
| Total | 46 | 379 | 55 | 480 | 125 | 77 | 81 | 283 | 71 | 669 | 30 | 770 | 23 | 90 | 75 | 188 | 1721 |
| Grand Total | 93 | 626 | 94 | 813 | 249 | 141 | 116 | 506 | 134 | 1325 | 54 | 1513 | 40 | 179 | 168 | 387 | 3219 |
| Apprch % | 11.4 | 77 | 11.6 | | 49.2 | 27.9 | 22.9 | | 8.9 | 87.6 | 3.6 | | 10.3 | 46.3 | 43.4 | | |
| Total % | 2.9 | 19.4 | 2.9 | 25.3 | 7.7 | 4.4 | 3.6 | 15.7 | 4.2 | 41.2 | 1.7 | 47 | 1.2 | 5.6 | 5.2 | 12 | |

| Start Time | DOOLITTLE DR Southbound | | | | WILLIAMS ST Westbound | | | | DOOLITTLE DR Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|------------|----------------------------|----|----|------------|--------------------------|----|----|------------|----------------------------|----|----|------------|--------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30

| | | | | | | | | | | | | | | | | | |
|--------------|-----------|------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|------------|----------|------------|-----------|-----------|-----------|-----------|------------|
| 07:30 | 12 | 51 | 10 | 73 | 34 | 22 | 14 | 70 | 16 | 195 | 5 | 216 | 2 | 31 | 29 | 62 | 421 |
| 07:45 | 16 | 75 | 10 | 101 | 32 | 21 | 15 | 68 | 26 | 238 | 4 | 268 | 4 | 29 | 33 | 66 | 503 |
| 08:00 | 21 | 99 | 18 | 138 | 34 | 19 | 23 | 76 | 30 | 195 | 8 | 233 | 10 | 52 | 17 | 79 | 526 |
| 08:15 | 8 | 107 | 8 | 123 | 38 | 26 | 27 | 91 | 11 | 194 | 7 | 212 | 3 | 14 | 25 | 42 | 468 |
| Total Volume | 57 | 332 | 46 | 435 | 138 | 88 | 79 | 305 | 83 | 822 | 24 | 929 | 19 | 126 | 104 | 249 | 1918 |
| % App. Total | 13.1 | 76.3 | 10.6 | | 45.2 | 28.9 | 25.9 | | 8.9 | 88.5 | 2.6 | | 7.6 | 50.6 | 41.8 | | |
| PHF | .679 | .776 | .639 | .788 | .908 | .846 | .731 | .838 | .692 | .863 | .750 | .867 | .475 | .606 | .788 | .788 | .912 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-williams-p
Site Code : 6
Start Date : 1/16/2013
Page No : 1

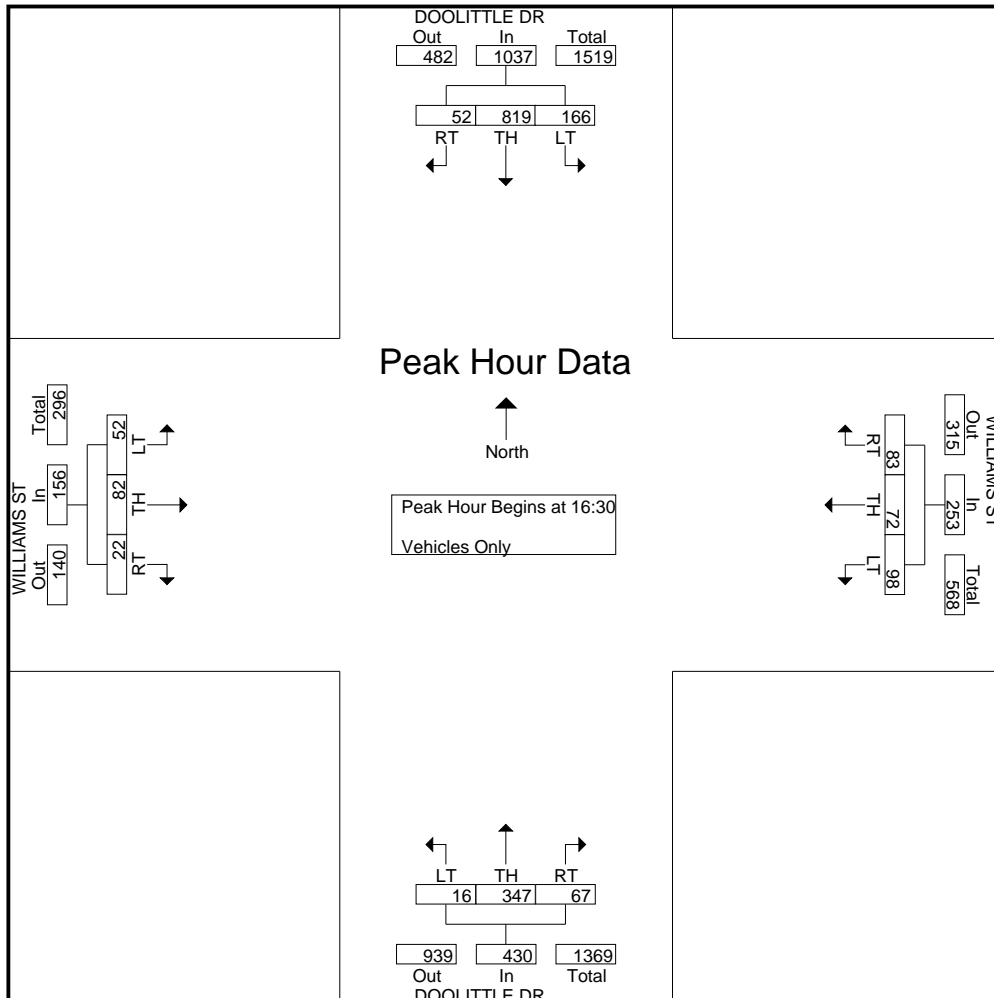
Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR Southbound | | | | WILLIAMS ST Westbound | | | | DOOLITTLE DR Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|--------------------|-------------------------|-------------|------------|-------------|-----------------------|------------|------------|------------|-------------------------|------------|-----------|------------|-----------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 8 | 137 | 32 | 177 | 25 | 19 | 25 | 69 | 9 | 94 | 4 | 107 | 4 | 16 | 12 | 32 | 385 |
| 16:15 | 13 | 131 | 20 | 164 | 12 | 12 | 22 | 46 | 17 | 84 | 2 | 103 | 3 | 24 | 11 | 38 | 351 |
| 16:30 | 15 | 218 | 37 | 270 | 20 | 19 | 20 | 59 | 20 | 104 | 4 | 128 | 3 | 24 | 13 | 40 | 497 |
| 16:45 | 11 | 164 | 45 | 220 | 20 | 19 | 27 | 66 | 13 | 79 | 4 | 96 | 4 | 22 | 17 | 43 | 425 |
| Total | 47 | 650 | 134 | 831 | 77 | 69 | 94 | 240 | 59 | 361 | 14 | 434 | 14 | 86 | 53 | 153 | 1658 |
| 17:00 | 14 | 234 | 49 | 297 | 26 | 17 | 21 | 64 | 12 | 87 | 6 | 105 | 9 | 16 | 9 | 34 | 500 |
| 17:15 | 12 | 203 | 35 | 250 | 17 | 17 | 30 | 64 | 22 | 77 | 2 | 101 | 6 | 20 | 13 | 39 | 454 |
| 17:30 | 12 | 190 | 43 | 245 | 16 | 21 | 9 | 46 | 19 | 66 | 1 | 86 | 9 | 23 | 11 | 43 | 420 |
| 17:45 | 13 | 185 | 20 | 218 | 13 | 11 | 21 | 45 | 18 | 86 | 5 | 109 | 9 | 18 | 9 | 36 | 408 |
| Total | 51 | 812 | 147 | 1010 | 72 | 66 | 81 | 219 | 71 | 316 | 14 | 401 | 33 | 77 | 42 | 152 | 1782 |
| Grand Total | 98 | 1462 | 281 | 1841 | 149 | 135 | 175 | 459 | 130 | 677 | 28 | 835 | 47 | 163 | 95 | 305 | 3440 |
| Apprch % | 5.3 | 79.4 | 15.3 | | 32.5 | 29.4 | 38.1 | | 15.6 | 81.1 | 3.4 | | 15.4 | 53.4 | 31.1 | | |
| Total % | 2.8 | 42.5 | 8.2 | 53.5 | 4.3 | 3.9 | 5.1 | 13.3 | 3.8 | 19.7 | 0.8 | 24.3 | 1.4 | 4.7 | 2.8 | 8.9 | |

| Start Time | DOOLITTLE DR Southbound | | | | WILLIAMS ST Westbound | | | | DOOLITTLE DR Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|------------|-------------------------|----|----|------------|-----------------------|----|----|------------|-------------------------|----|----|------------|-----------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:30

| | | | | | | | | | | | | | | | | | |
|---------------------|-----------|------------|------------|-------------|-----------|-----------|-----------|------------|-----------|------------|-----------|------------|-----------|-----------|-----------|------------|-------------|
| 16:30 | 15 | 218 | 37 | 270 | 20 | 19 | 20 | 59 | 20 | 104 | 4 | 128 | 3 | 24 | 13 | 40 | 497 |
| 16:45 | 11 | 164 | 45 | 220 | 20 | 19 | 27 | 66 | 13 | 79 | 4 | 96 | 4 | 22 | 17 | 43 | 425 |
| 17:00 | 14 | 234 | 49 | 297 | 26 | 17 | 21 | 64 | 12 | 87 | 6 | 105 | 9 | 16 | 9 | 34 | 500 |
| 17:15 | 12 | 203 | 35 | 250 | 17 | 17 | 30 | 64 | 22 | 77 | 2 | 101 | 6 | 20 | 13 | 39 | 454 |
| Total Volume | 52 | 819 | 166 | 1037 | 83 | 72 | 98 | 253 | 67 | 347 | 16 | 430 | 22 | 82 | 52 | 156 | 1876 |
| % App. Total | 5 | 79 | 16 | | 32.8 | 28.5 | 38.7 | | 15.6 | 80.7 | 3.7 | | 14.1 | 52.6 | 33.3 | | |
| PHF | .867 | .875 | .847 | .873 | .798 | .947 | .817 | .958 | .761 | .834 | .667 | .840 | .611 | .854 | .765 | .907 | .938 |



MARKS TRAFFIC DATA

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916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-williams-s
Site Code : 6
Start Date : 1/26/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR Southbound | | | | WILLIAMS ST Westbound | | | | DOOLITTLE DR Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|--------------------|-------------------------|-------------|------------|-------------|-----------------------|------------|------------|------------|-------------------------|------------|-----------|-------------|-----------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 10 | 49 | 5 | 64 | 6 | 10 | 15 | 31 | 6 | 53 | 2 | 61 | 3 | 17 | 4 | 24 | 180 |
| 10:15 | 6 | 60 | 6 | 72 | 16 | 7 | 18 | 41 | 15 | 52 | 4 | 71 | 3 | 10 | 5 | 18 | 202 |
| 10:30 | 7 | 58 | 10 | 75 | 8 | 12 | 12 | 32 | 16 | 50 | 3 | 69 | 3 | 7 | 10 | 20 | 196 |
| 10:45 | 9 | 68 | 10 | 87 | 12 | 12 | 20 | 44 | 11 | 69 | 2 | 82 | 1 | 13 | 7 | 21 | 234 |
| Total | 32 | 235 | 31 | 298 | 42 | 41 | 65 | 148 | 48 | 224 | 11 | 283 | 10 | 47 | 26 | 83 | 812 |
| 11:00 | 6 | 77 | 11 | 94 | 16 | 10 | 17 | 43 | 19 | 46 | 3 | 68 | 3 | 9 | 9 | 21 | 226 |
| 11:15 | 6 | 60 | 10 | 76 | 18 | 14 | 11 | 43 | 14 | 57 | 4 | 75 | 2 | 10 | 7 | 19 | 213 |
| 11:30 | 5 | 95 | 5 | 105 | 11 | 15 | 11 | 37 | 16 | 56 | 2 | 74 | 4 | 15 | 9 | 28 | 244 |
| 11:45 | 5 | 93 | 9 | 107 | 4 | 15 | 20 | 39 | 18 | 72 | 2 | 92 | 2 | 13 | 7 | 22 | 260 |
| Total | 22 | 325 | 35 | 382 | 49 | 54 | 59 | 162 | 67 | 231 | 11 | 309 | 11 | 47 | 32 | 90 | 943 |
| 12:00 | 6 | 71 | 14 | 91 | 13 | 16 | 13 | 42 | 15 | 67 | 0 | 82 | 1 | 16 | 11 | 28 | 243 |
| 12:15 | 6 | 72 | 8 | 86 | 8 | 13 | 18 | 39 | 13 | 62 | 1 | 76 | 5 | 14 | 7 | 26 | 227 |
| 12:30 | 3 | 91 | 11 | 105 | 15 | 12 | 19 | 46 | 18 | 59 | 2 | 79 | 1 | 6 | 8 | 15 | 245 |
| 12:45 | 6 | 76 | 7 | 89 | 13 | 15 | 29 | 57 | 12 | 75 | 3 | 90 | 3 | 15 | 9 | 27 | 263 |
| Total | 21 | 310 | 40 | 371 | 49 | 56 | 79 | 184 | 58 | 263 | 6 | 327 | 10 | 51 | 35 | 96 | 978 |
| 13:00 | 4 | 88 | 12 | 104 | 12 | 12 | 18 | 42 | 16 | 65 | 3 | 84 | 3 | 12 | 7 | 22 | 252 |
| 13:15 | 11 | 78 | 7 | 96 | 12 | 12 | 10 | 34 | 18 | 69 | 2 | 89 | 2 | 13 | 6 | 21 | 240 |
| 13:30 | 4 | 69 | 11 | 84 | 13 | 17 | 31 | 61 | 20 | 58 | 2 | 80 | 2 | 5 | 7 | 14 | 239 |
| 13:45 | 6 | 75 | 6 | 87 | 3 | 17 | 22 | 42 | 12 | 80 | 2 | 94 | 2 | 18 | 7 | 27 | 250 |
| Total | 25 | 310 | 36 | 371 | 40 | 58 | 81 | 179 | 66 | 272 | 9 | 347 | 9 | 48 | 27 | 84 | 981 |
| Grand Total | 100 | 1180 | 142 | 1422 | 180 | 209 | 284 | 673 | 239 | 990 | 37 | 1266 | 40 | 193 | 120 | 353 | 3714 |
| Apprch % | 7 | 83 | 10 | | 26.7 | 31.1 | 42.2 | | 18.9 | 78.2 | 2.9 | | 11.3 | 54.7 | 34 | | |
| Total % | 2.7 | 31.8 | 3.8 | 38.3 | 4.8 | 5.6 | 7.6 | 18.1 | 6.4 | 26.7 | 1 | 34.1 | 1.1 | 5.2 | 3.2 | 9.5 | |

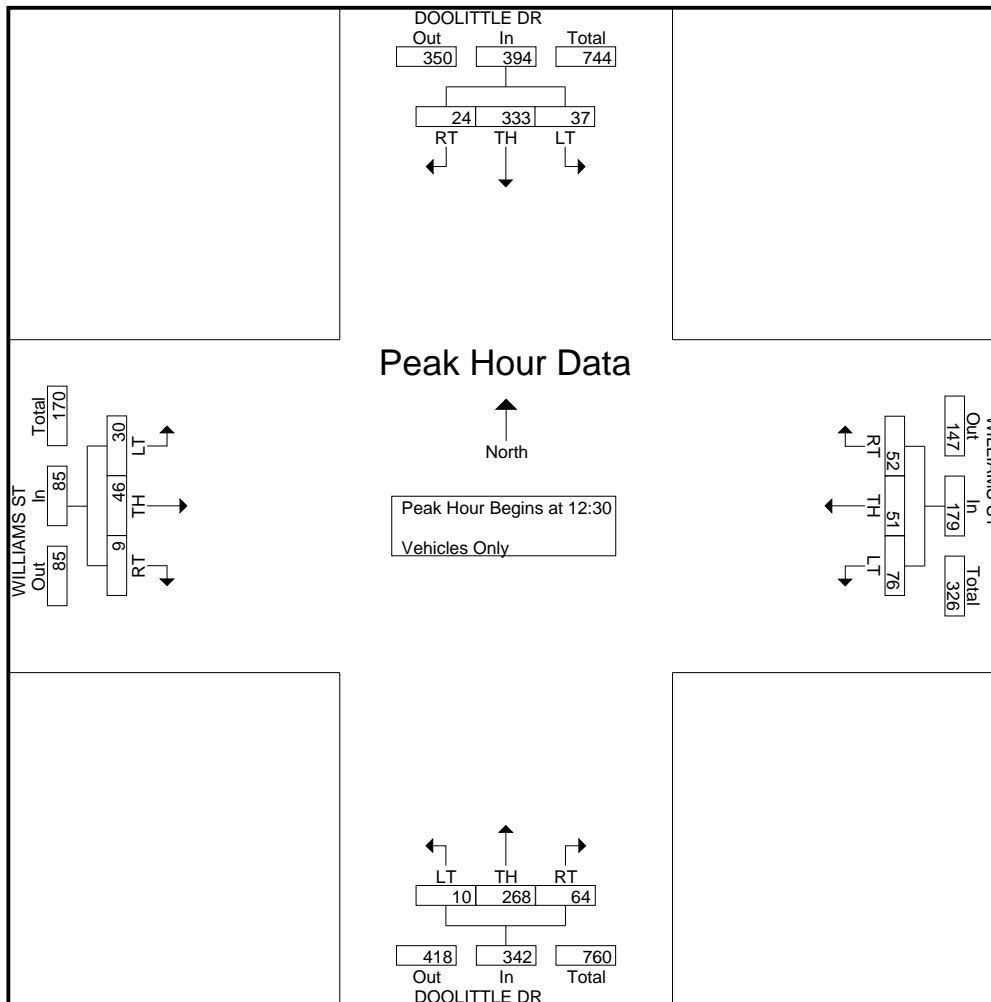
| Start Time | DOOLITTLE DR Southbound | | | | WILLIAMS ST Westbound | | | | DOOLITTLE DR Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|---|-------------------------|-----------|-----------|------------|-----------------------|-----------|-----------|------------|-------------------------|-----------|----------|------------|-----------------------|-----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:30 | | | | | | | | | | | | | | | | | |
| 12:30 | 3 | 91 | 11 | 105 | 15 | 12 | 19 | 46 | 18 | 59 | 2 | 79 | 1 | 6 | 8 | 15 | 245 |
| 12:45 | 6 | 76 | 7 | 89 | 13 | 15 | 29 | 57 | 12 | 75 | 3 | 90 | 3 | 15 | 9 | 27 | 263 |
| 13:00 | 4 | 88 | 12 | 104 | 12 | 12 | 18 | 42 | 16 | 65 | 3 | 84 | 3 | 12 | 7 | 22 | 252 |
| 13:15 | 11 | 78 | 7 | 96 | 12 | 12 | 10 | 34 | 18 | 69 | 2 | 89 | 2 | 13 | 6 | 21 | 240 |
| Total Volume | 24 | 333 | 37 | 394 | 52 | 51 | 76 | 179 | 64 | 268 | 10 | 342 | 9 | 46 | 30 | 85 | 1000 |
| % App. Total | 6.1 | 84.5 | 9.4 | | 29.1 | 28.5 | 42.5 | | 18.7 | 78.4 | 2.9 | | 10.6 | 54.1 | 35.3 | | |
| PHF | .545 | .915 | .771 | .938 | .867 | .850 | .655 | .785 | .889 | .893 | .833 | .950 | .750 | .767 | .833 | .787 | .951 |

MARKS TRAFFIC DATA

mietekm@comcast.net
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CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-williams-s
Site Code : 6
Start Date : 1/26/2013
Page No : 2



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

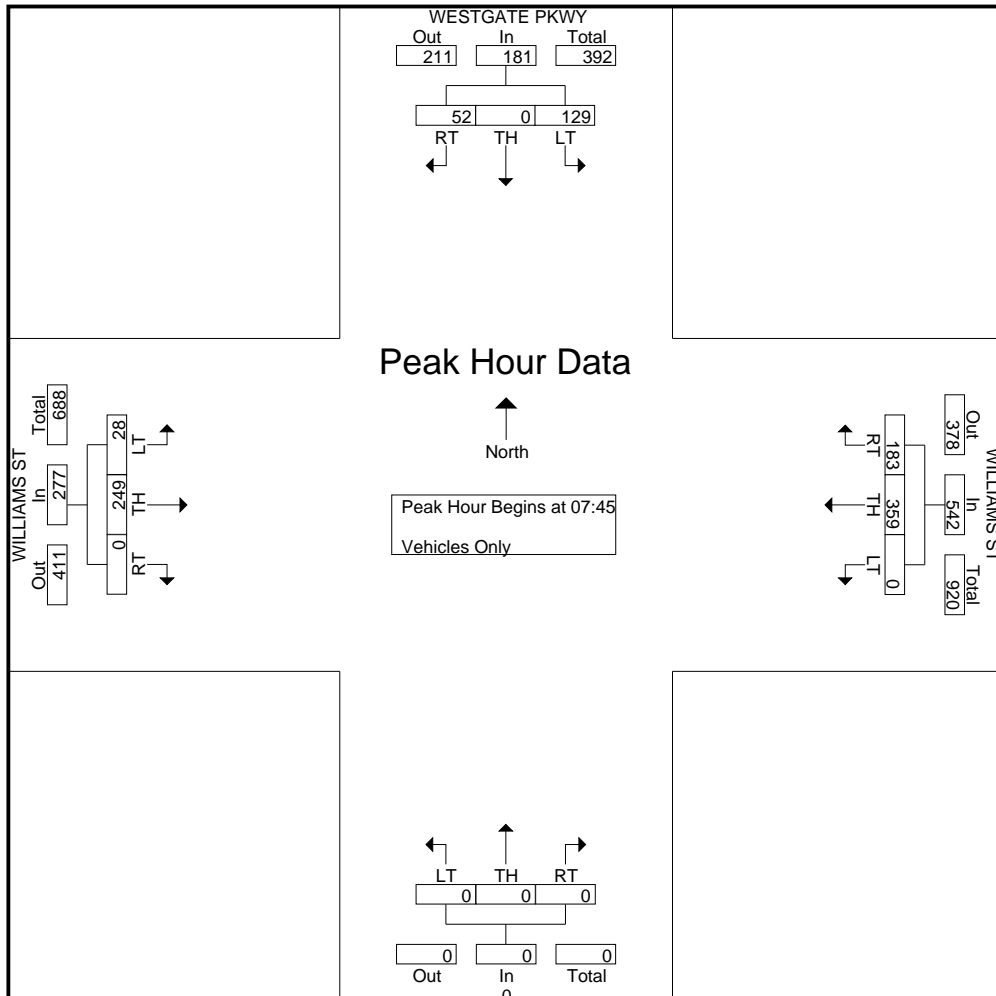
File Name : westgate-williams-a
Site Code : 7
Start Date : 1/15/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | WESTGATE PKWY Southbound | | | | WILLIAMS ST Westbound | | | | 0 Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|--------------------|-----------------------------|----------|------------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|--------------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 9 | 0 | 18 | 27 | 12 | 57 | 0 | 69 | 0 | 0 | 0 | 0 | 0 | 45 | 3 | 48 | 144 |
| 07:15 | 9 | 0 | 17 | 26 | 17 | 70 | 0 | 87 | 0 | 0 | 0 | 0 | 0 | 43 | 2 | 45 | 158 |
| 07:30 | 6 | 0 | 13 | 19 | 19 | 78 | 0 | 97 | 0 | 0 | 0 | 0 | 0 | 42 | 5 | 47 | 163 |
| 07:45 | 7 | 0 | 27 | 34 | 52 | 88 | 0 | 140 | 0 | 0 | 0 | 0 | 0 | 66 | 5 | 71 | 245 |
| Total | 31 | 0 | 75 | 106 | 100 | 293 | 0 | 393 | 0 | 0 | 0 | 0 | 0 | 196 | 15 | 211 | 710 |
| 08:00 | 15 | 0 | 51 | 66 | 47 | 84 | 0 | 131 | 0 | 0 | 0 | 0 | 0 | 76 | 7 | 83 | 280 |
| 08:15 | 18 | 0 | 28 | 46 | 48 | 120 | 0 | 168 | 0 | 0 | 0 | 0 | 0 | 60 | 7 | 67 | 281 |
| 08:30 | 12 | 0 | 23 | 35 | 36 | 67 | 0 | 103 | 0 | 0 | 0 | 0 | 0 | 47 | 9 | 56 | 194 |
| 08:45 | 6 | 0 | 24 | 30 | 33 | 78 | 0 | 111 | 0 | 0 | 0 | 0 | 0 | 37 | 6 | 43 | 184 |
| Total | 51 | 0 | 126 | 177 | 164 | 349 | 0 | 513 | 0 | 0 | 0 | 0 | 0 | 220 | 29 | 249 | 939 |
| Grand Total | 82 | 0 | 201 | 283 | 264 | 642 | 0 | 906 | 0 | 0 | 0 | 0 | 0 | 416 | 44 | 460 | 1649 |
| Apprch % | 29 | 0 | 71 | | 29.1 | 70.9 | 0 | | 0 | 0 | 0 | 0 | 0 | 90.4 | 9.6 | | |
| Total % | 5 | 0 | 12.2 | 17.2 | 16 | 38.9 | 0 | 54.9 | 0 | 0 | 0 | 0 | 0 | 25.2 | 2.7 | 27.9 | |

| Start Time | WESTGATE PKWY Southbound | | | | WILLIAMS ST Westbound | | | | 0 Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|---------------------|-----------------------------|----------|------------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|--------------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:45 | 7 | 0 | 27 | 34 | 52 | 88 | 0 | 140 | 0 | 0 | 0 | 0 | 0 | 66 | 5 | 71 | 245 |
| 08:00 | 15 | 0 | 51 | 66 | 47 | 84 | 0 | 131 | 0 | 0 | 0 | 0 | 0 | 76 | 7 | 83 | 280 |
| 08:15 | 18 | 0 | 28 | 46 | 48 | 120 | 0 | 168 | 0 | 0 | 0 | 0 | 0 | 60 | 7 | 67 | 281 |
| 08:30 | 12 | 0 | 23 | 35 | 36 | 67 | 0 | 103 | 0 | 0 | 0 | 0 | 0 | 47 | 9 | 56 | 194 |
| Total Volume | 52 | 0 | 129 | 181 | 183 | 359 | 0 | 542 | 0 | 0 | 0 | 0 | 0 | 249 | 28 | 277 | 1000 |
| % App. Total | 28.7 | 0 | 71.3 | | 33.8 | 66.2 | 0 | | 0 | 0 | 0 | 0 | 0 | 89.9 | 10.1 | | |
| PHF | .722 | .000 | .632 | .686 | .880 | .748 | .000 | .807 | .000 | .000 | .000 | .000 | .000 | .819 | .778 | .834 | .890 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:45



MARKS TRAFFIC DATA

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916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

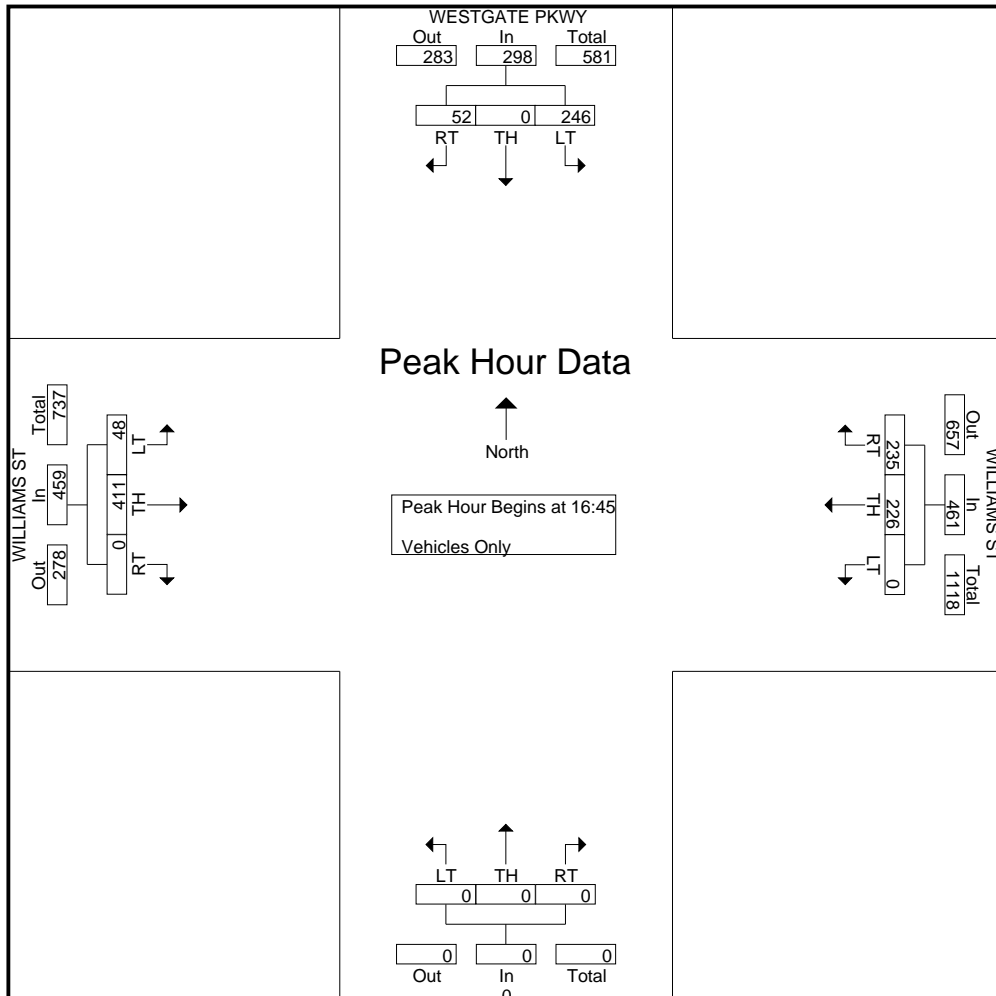
File Name : westgate-williams-p
Site Code : 7
Start Date : 1/15/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | WESTGATE PKWY Southbound | | | | WILLIAMS ST Westbound | | | | 0 Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|--------------------|-----------------------------|----------|------------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|--------------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 12 | 0 | 47 | 59 | 47 | 58 | 0 | 105 | 0 | 0 | 0 | 0 | 0 | 73 | 12 | 85 | 249 |
| 16:15 | 19 | 0 | 54 | 73 | 43 | 56 | 0 | 99 | 0 | 0 | 0 | 0 | 0 | 72 | 11 | 83 | 255 |
| 16:30 | 16 | 0 | 63 | 79 | 48 | 62 | 0 | 110 | 0 | 0 | 0 | 0 | 0 | 85 | 10 | 95 | 284 |
| 16:45 | 14 | 0 | 54 | 68 | 57 | 63 | 0 | 120 | 0 | 0 | 0 | 0 | 0 | 93 | 11 | 104 | 292 |
| Total | 61 | 0 | 218 | 279 | 195 | 239 | 0 | 434 | 0 | 0 | 0 | 0 | 0 | 323 | 44 | 367 | 1080 |
| 17:00 | 14 | 0 | 64 | 78 | 62 | 45 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 131 | 17 | 148 | 333 |
| 17:15 | 9 | 0 | 48 | 57 | 53 | 59 | 0 | 112 | 0 | 0 | 0 | 0 | 0 | 102 | 13 | 115 | 284 |
| 17:30 | 15 | 0 | 80 | 95 | 63 | 59 | 0 | 122 | 0 | 0 | 0 | 0 | 0 | 85 | 7 | 92 | 309 |
| 17:45 | 10 | 0 | 71 | 81 | 51 | 42 | 0 | 93 | 0 | 0 | 0 | 0 | 0 | 68 | 10 | 78 | 252 |
| Total | 48 | 0 | 263 | 311 | 229 | 205 | 0 | 434 | 0 | 0 | 0 | 0 | 0 | 386 | 47 | 433 | 1178 |
| Grand Total | 109 | 0 | 481 | 590 | 424 | 444 | 0 | 868 | 0 | 0 | 0 | 0 | 0 | 709 | 91 | 800 | 2258 |
| Apprch % | 18.5 | 0 | 81.5 | | 48.8 | 51.2 | 0 | | 0 | 0 | 0 | 0 | 0 | 88.6 | 11.4 | | |
| Total % | 4.8 | 0 | 21.3 | 26.1 | 18.8 | 19.7 | 0 | 38.4 | 0 | 0 | 0 | 0 | 0 | 31.4 | 4 | 35.4 | |

| Start Time | WESTGATE PKWY Southbound | | | | WILLIAMS ST Westbound | | | | 0 Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|---------------------|-----------------------------|----------|------------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|--------------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:45 | 14 | 0 | 54 | 68 | 57 | 63 | 0 | 120 | 0 | 0 | 0 | 0 | 0 | 93 | 11 | 104 | 292 |
| 17:00 | 14 | 0 | 64 | 78 | 62 | 45 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 131 | 17 | 148 | 333 |
| 17:15 | 9 | 0 | 48 | 57 | 53 | 59 | 0 | 112 | 0 | 0 | 0 | 0 | 0 | 102 | 13 | 115 | 284 |
| 17:30 | 15 | 0 | 80 | 95 | 63 | 59 | 0 | 122 | 0 | 0 | 0 | 0 | 0 | 85 | 7 | 92 | 309 |
| Total Volume | 52 | 0 | 246 | 298 | 235 | 226 | 0 | 461 | 0 | 0 | 0 | 0 | 0 | 411 | 48 | 459 | 1218 |
| % App. Total | 17.4 | 0 | 82.6 | | 51 | 49 | 0 | | 0 | 0 | 0 | 0 | 0 | 89.5 | 10.5 | | |
| PHF | .867 | .000 | .769 | .784 | .933 | .897 | .000 | .945 | .000 | .000 | .000 | .000 | .000 | .784 | .706 | .775 | .914 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:45



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-williams-a
Site Code : 8
Start Date : 1/23/2013
Page No : 1

Groups Printed- Vehicles Only

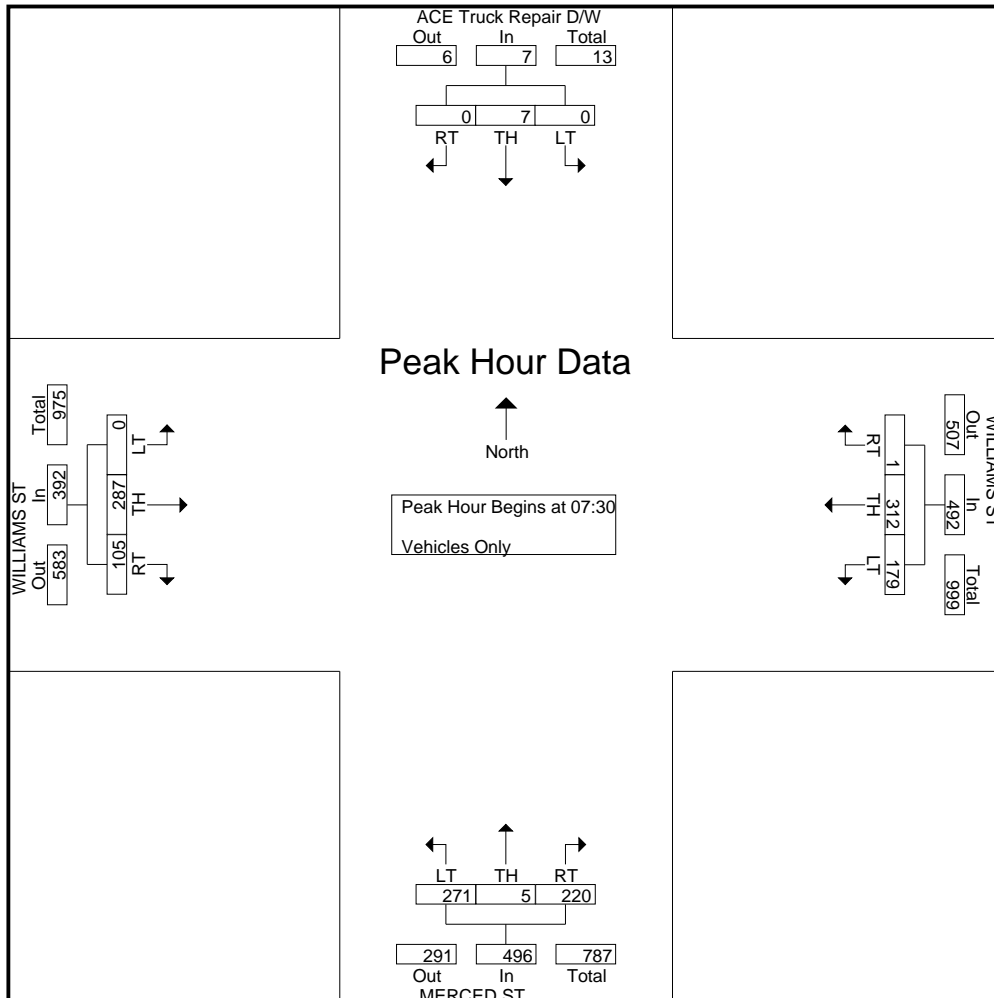
| Start Time | ACE Truck Repair D/W Southbound | | | | WILLIAMS ST Westbound | | | | MERCED ST Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|--------------------|---------------------------------|-----|----|------------|-----------------------|------|------|------------|----------------------|-----|------|------------|-----------------------|------|-----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 0 | 3 | 0 | 3 | 0 | 28 | 20 | 48 | 12 | 0 | 36 | 48 | 39 | 32 | 0 | 71 | 170 |
| 07:15 | 0 | 1 | 0 | 1 | 1 | 47 | 30 | 78 | 29 | 0 | 48 | 77 | 33 | 32 | 2 | 67 | 223 |
| 07:30 | 0 | 3 | 0 | 3 | 1 | 56 | 40 | 97 | 44 | 1 | 62 | 107 | 24 | 49 | 0 | 73 | 280 |
| 07:45 | 0 | 3 | 0 | 3 | 0 | 80 | 38 | 118 | 61 | 1 | 60 | 122 | 20 | 89 | 0 | 109 | 352 |
| Total | 0 | 10 | 0 | 10 | 2 | 211 | 128 | 341 | 146 | 2 | 206 | 354 | 116 | 202 | 2 | 320 | 1025 |
| 08:00 | 0 | 0 | 0 | 0 | 0 | 84 | 56 | 140 | 83 | 2 | 76 | 161 | 31 | 100 | 0 | 131 | 432 |
| 08:15 | 0 | 1 | 0 | 1 | 0 | 92 | 45 | 137 | 32 | 1 | 73 | 106 | 30 | 49 | 0 | 79 | 323 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 46 | 22 | 68 | 24 | 0 | 56 | 80 | 27 | 30 | 0 | 57 | 205 |
| 08:45 | 0 | 0 | 0 | 0 | 1 | 42 | 28 | 71 | 27 | 1 | 53 | 81 | 30 | 29 | 1 | 60 | 212 |
| Total | 0 | 1 | 0 | 1 | 1 | 264 | 151 | 416 | 166 | 4 | 258 | 428 | 118 | 208 | 1 | 327 | 1172 |
| Grand Total | 0 | 11 | 0 | 11 | 3 | 475 | 279 | 757 | 312 | 6 | 464 | 782 | 234 | 410 | 3 | 647 | 2197 |
| Apprch % | 0 | 100 | 0 | | 0.4 | 62.7 | 36.9 | | 39.9 | 0.8 | 59.3 | | 36.2 | 63.4 | 0.5 | | |
| Total % | 0 | 0.5 | 0 | 0.5 | 0.1 | 21.6 | 12.7 | 34.5 | 14.2 | 0.3 | 21.1 | 35.6 | 10.7 | 18.7 | 0.1 | 29.4 | |

| Start Time | ACE Truck Repair D/W Southbound | | | | WILLIAMS ST Westbound | | | | MERCED ST Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|------------|---------------------------------|----|----|------------|-----------------------|----|----|------------|----------------------|----|----|------------|-----------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30

| | | | | | | | | | | | | | | | | | |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:30 | 0 | 3 | 0 | 3 | 1 | 56 | 40 | 97 | 44 | 1 | 62 | 107 | 24 | 49 | 0 | 73 | 280 |
| 07:45 | 0 | 3 | 0 | 3 | 0 | 80 | 38 | 118 | 61 | 1 | 60 | 122 | 20 | 89 | 0 | 109 | 352 |
| 08:00 | 0 | 0 | 0 | 0 | 0 | 84 | 56 | 140 | 83 | 2 | 76 | 161 | 31 | 100 | 0 | 131 | 432 |
| 08:15 | 0 | 1 | 0 | 1 | 0 | 92 | 45 | 137 | 32 | 1 | 73 | 106 | 30 | 49 | 0 | 79 | 323 |
| Total Volume | 0 | 7 | 0 | 7 | 1 | 312 | 179 | 492 | 220 | 5 | 271 | 496 | 105 | 287 | 0 | 392 | 1387 |
| % App. Total | 0 | 100 | 0 | | 0.2 | 63.4 | 36.4 | | 44.4 | 1 | 54.6 | | 26.8 | 73.2 | 0 | | |
| PHF | .000 | .583 | .000 | .583 | .250 | .848 | .799 | .879 | .663 | .625 | .891 | .770 | .847 | .718 | .000 | .748 | .803 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-williams-p
Site Code : 8
Start Date : 1/23/2013
Page No : 1

Groups Printed- Vehicles Only

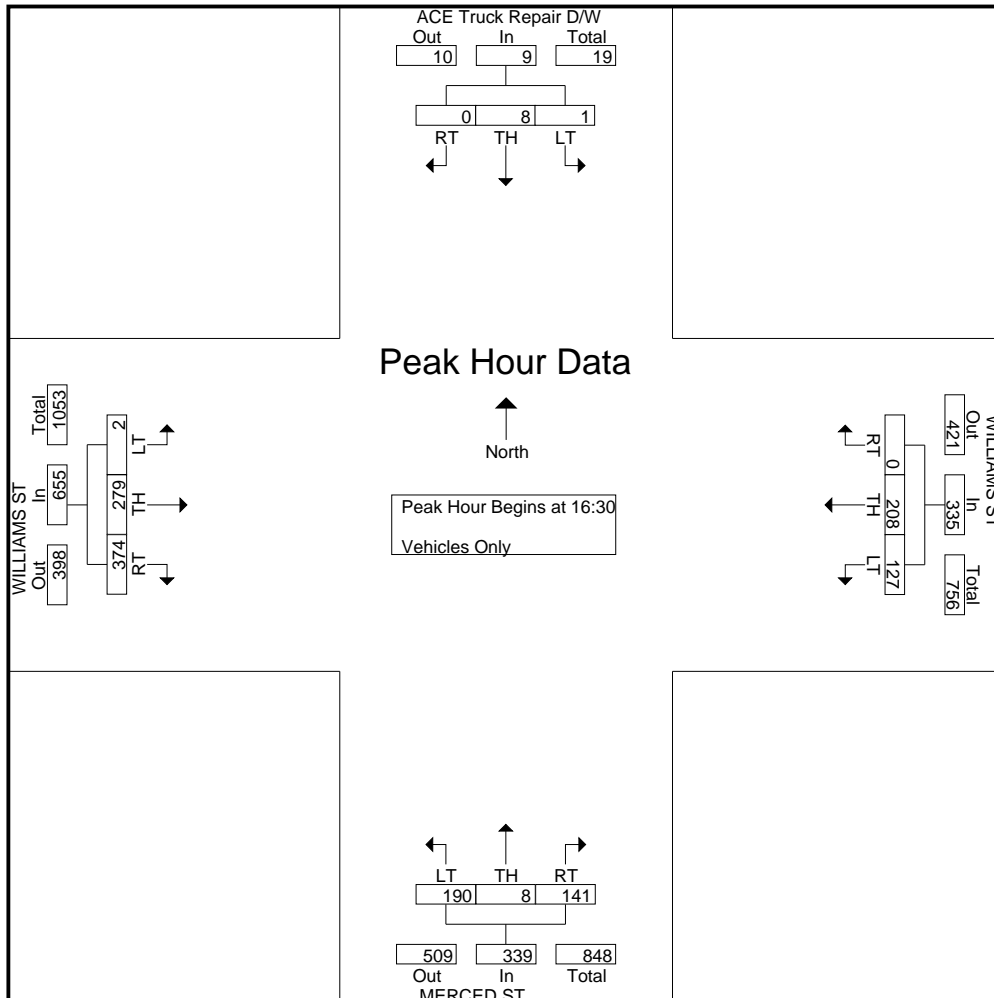
| Start Time | ACE Truck Repair D/W Southbound | | | | WILLIAMS ST Westbound | | | | MERCED ST Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|--------------------|------------------------------------|-----------|----------|------------|--------------------------|------------|------------|------------|-------------------------|-----------|------------|------------|--------------------------|------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 1 | 0 | 1 | 2 | 0 | 46 | 47 | 93 | 47 | 0 | 51 | 98 | 74 | 63 | 1 | 138 | 331 |
| 16:15 | 1 | 1 | 1 | 3 | 0 | 49 | 21 | 70 | 29 | 2 | 45 | 76 | 59 | 52 | 0 | 111 | 260 |
| 16:30 | 0 | 1 | 0 | 1 | 0 | 52 | 28 | 80 | 29 | 3 | 54 | 86 | 96 | 71 | 1 | 168 | 335 |
| 16:45 | 0 | 3 | 0 | 3 | 0 | 46 | 28 | 74 | 43 | 1 | 55 | 99 | 86 | 54 | 1 | 141 | 317 |
| Total | 2 | 5 | 2 | 9 | 0 | 193 | 124 | 317 | 148 | 6 | 205 | 359 | 315 | 240 | 3 | 558 | 1243 |
| 17:00 | 0 | 3 | 1 | 4 | 0 | 54 | 33 | 87 | 31 | 3 | 47 | 81 | 118 | 81 | 0 | 199 | 371 |
| 17:15 | 0 | 1 | 0 | 1 | 0 | 56 | 38 | 94 | 38 | 1 | 34 | 73 | 74 | 73 | 0 | 147 | 315 |
| 17:30 | 0 | 0 | 1 | 1 | 1 | 59 | 29 | 89 | 43 | 1 | 39 | 83 | 71 | 80 | 0 | 151 | 324 |
| 17:45 | 0 | 1 | 0 | 1 | 0 | 37 | 24 | 61 | 45 | 1 | 30 | 76 | 58 | 67 | 0 | 125 | 263 |
| Total | 0 | 5 | 2 | 7 | 1 | 206 | 124 | 331 | 157 | 6 | 150 | 313 | 321 | 301 | 0 | 622 | 1273 |
| Grand Total | 2 | 10 | 4 | 16 | 1 | 399 | 248 | 648 | 305 | 12 | 355 | 672 | 636 | 541 | 3 | 1180 | 2516 |
| Apprch % | 12.5 | 62.5 | 25 | | 0.2 | 61.6 | 38.3 | | 45.4 | 1.8 | 52.8 | | 53.9 | 45.8 | 0.3 | | |
| Total % | 0.1 | 0.4 | 0.2 | 0.6 | 0 | 15.9 | 9.9 | 25.8 | 12.1 | 0.5 | 14.1 | 26.7 | 25.3 | 21.5 | 0.1 | 46.9 | |

| Start Time | ACE Truck Repair D/W Southbound | | | | WILLIAMS ST Westbound | | | | MERCED ST Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|------------|------------------------------------|----|----|------------|--------------------------|----|----|------------|-------------------------|----|----|------------|--------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:30

| | | | | | | | | | | | | | | | | | |
|---------------------|----------|----------|----------|----------|----------|------------|------------|------------|------------|----------|------------|------------|------------|------------|----------|------------|-------------|
| 16:30 | 0 | 1 | 0 | 1 | 0 | 52 | 28 | 80 | 29 | 3 | 54 | 86 | 96 | 71 | 1 | 168 | 335 |
| 16:45 | 0 | 3 | 0 | 3 | 0 | 46 | 28 | 74 | 43 | 1 | 55 | 99 | 86 | 54 | 1 | 141 | 317 |
| 17:00 | 0 | 3 | 1 | 4 | 0 | 54 | 33 | 87 | 31 | 3 | 47 | 81 | 118 | 81 | 0 | 199 | 371 |
| 17:15 | 0 | 1 | 0 | 1 | 0 | 56 | 38 | 94 | 38 | 1 | 34 | 73 | 74 | 73 | 0 | 147 | 315 |
| Total Volume | 0 | 8 | 1 | 9 | 0 | 208 | 127 | 335 | 141 | 8 | 190 | 339 | 374 | 279 | 2 | 655 | 1338 |
| % App. Total | 0 | 88.9 | 11.1 | | 0 | 62.1 | 37.9 | | 41.6 | 2.4 | 56 | | 57.1 | 42.6 | 0.3 | | |
| PHF | .000 | .667 | .250 | .563 | .000 | .929 | .836 | .891 | .820 | .667 | .864 | .856 | .792 | .861 | .500 | .823 | .902 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-williams-s
Site Code : 8
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | ACE Truck Repair D/W Southbound | | | | WILLIAMS ST Westbound | | | | MERCED ST Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|--------------------|---------------------------------|----------|----------|------------|-----------------------|------------|------------|-------------|----------------------|----------|------------|-------------|-----------------------|------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 47 | 19 | 66 | 31 | 0 | 41 | 72 | 35 | 38 | 0 | 73 | 211 |
| 10:15 | 0 | 0 | 0 | 0 | 0 | 35 | 20 | 55 | 20 | 0 | 44 | 64 | 29 | 26 | 0 | 55 | 174 |
| 10:30 | 0 | 1 | 1 | 2 | 0 | 54 | 23 | 77 | 29 | 0 | 38 | 67 | 47 | 34 | 0 | 81 | 227 |
| 10:45 | 0 | 0 | 1 | 1 | 1 | 44 | 16 | 61 | 20 | 0 | 67 | 87 | 41 | 36 | 1 | 78 | 227 |
| Total | 0 | 1 | 2 | 3 | 1 | 180 | 78 | 259 | 100 | 0 | 190 | 290 | 152 | 134 | 1 | 287 | 839 |
| 11:00 | 1 | 0 | 0 | 1 | 0 | 36 | 28 | 64 | 27 | 2 | 37 | 66 | 36 | 42 | 0 | 78 | 209 |
| 11:15 | 0 | 0 | 0 | 0 | 0 | 42 | 20 | 62 | 31 | 1 | 41 | 73 | 42 | 38 | 0 | 80 | 215 |
| 11:30 | 0 | 0 | 0 | 0 | 0 | 41 | 20 | 61 | 22 | 0 | 48 | 70 | 40 | 41 | 0 | 81 | 212 |
| 11:45 | 0 | 0 | 0 | 0 | 0 | 59 | 24 | 83 | 38 | 1 | 37 | 76 | 49 | 43 | 1 | 93 | 252 |
| Total | 1 | 0 | 0 | 1 | 0 | 178 | 92 | 270 | 118 | 4 | 163 | 285 | 167 | 164 | 1 | 332 | 888 |
| 12:00 | 0 | 0 | 0 | 0 | 0 | 44 | 39 | 83 | 37 | 0 | 53 | 90 | 44 | 32 | 0 | 76 | 249 |
| 12:15 | 0 | 2 | 0 | 2 | 0 | 47 | 26 | 73 | 27 | 0 | 39 | 66 | 40 | 39 | 0 | 79 | 220 |
| 12:30 | 1 | 1 | 0 | 2 | 1 | 46 | 30 | 77 | 30 | 0 | 40 | 70 | 32 | 46 | 1 | 79 | 228 |
| 12:45 | 1 | 0 | 0 | 1 | 0 | 48 | 31 | 79 | 24 | 0 | 57 | 81 | 51 | 45 | 0 | 96 | 257 |
| Total | 2 | 3 | 0 | 5 | 1 | 185 | 126 | 312 | 118 | 0 | 189 | 307 | 167 | 162 | 1 | 330 | 954 |
| 13:00 | 1 | 3 | 0 | 4 | 0 | 32 | 34 | 66 | 28 | 3 | 48 | 79 | 44 | 47 | 1 | 92 | 241 |
| 13:15 | 1 | 1 | 0 | 2 | 0 | 44 | 25 | 69 | 20 | 0 | 52 | 72 | 43 | 40 | 2 | 85 | 228 |
| 13:30 | 0 | 0 | 0 | 0 | 0 | 40 | 21 | 61 | 31 | 0 | 40 | 71 | 38 | 41 | 0 | 79 | 211 |
| 13:45 | 0 | 0 | 0 | 0 | 0 | 32 | 30 | 62 | 24 | 0 | 61 | 85 | 57 | 44 | 0 | 101 | 248 |
| Total | 2 | 4 | 0 | 6 | 0 | 148 | 110 | 258 | 103 | 3 | 201 | 307 | 182 | 172 | 3 | 357 | 928 |
| Grand Total | 5 | 8 | 2 | 15 | 2 | 691 | 406 | 1099 | 439 | 7 | 743 | 1189 | 668 | 632 | 6 | 1306 | 3609 |
| Apprch % | 33.3 | 53.3 | 13.3 | | 0.2 | 62.9 | 36.9 | | 36.9 | 0.6 | 62.5 | | 51.1 | 48.4 | 0.5 | | |
| Total % | 0.1 | 0.2 | 0.1 | 0.4 | 0.1 | 19.1 | 11.2 | 30.5 | 12.2 | 0.2 | 20.6 | 32.9 | 18.5 | 17.5 | 0.2 | 36.2 | |

| Start Time | ACE Truck Repair D/W Southbound | | | | WILLIAMS ST Westbound | | | | MERCED ST Northbound | | | | WILLIAMS ST Eastbound | | | | Int. Total |
|---------------------|---------------------------------|----------|----------|------------|-----------------------|------------|------------|------------|----------------------|----------|------------|------------|-----------------------|------------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 12:00 | 0 | 0 | 0 | 0 | 0 | 44 | 39 | 83 | 37 | 0 | 53 | 90 | 44 | 32 | 0 | 76 | 249 |
| 12:15 | 0 | 2 | 0 | 2 | 0 | 47 | 26 | 73 | 27 | 0 | 39 | 66 | 40 | 39 | 0 | 79 | 220 |
| 12:30 | 1 | 1 | 0 | 2 | 1 | 46 | 30 | 77 | 30 | 0 | 40 | 70 | 32 | 46 | 1 | 79 | 228 |
| 12:45 | 1 | 0 | 0 | 1 | 0 | 48 | 31 | 79 | 24 | 0 | 57 | 81 | 51 | 45 | 0 | 96 | 257 |
| Total Volume | 2 | 3 | 0 | 5 | 1 | 185 | 126 | 312 | 118 | 0 | 189 | 307 | 167 | 162 | 1 | 330 | 954 |
| % App. Total | 40 | 60 | 0 | | 0.3 | 59.3 | 40.4 | | 38.4 | 0 | 61.6 | | 50.6 | 49.1 | 0.3 | | |
| PHF | .500 | .375 | .000 | .625 | .250 | .964 | .808 | .940 | .797 | .000 | .829 | .853 | .819 | .880 | .250 | .859 | .928 |

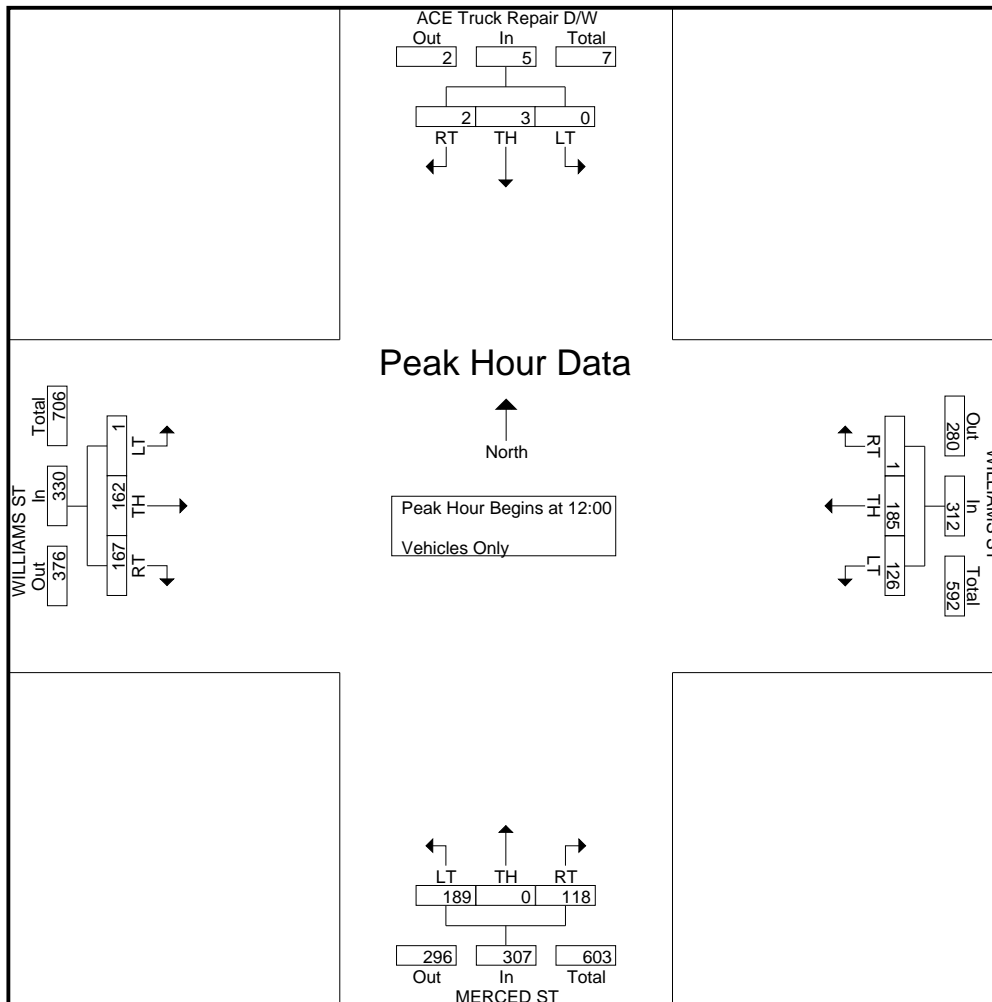
Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 12:00

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-williams-s
Site Code : 8
Start Date : 2/2/2013
Page No : 2



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

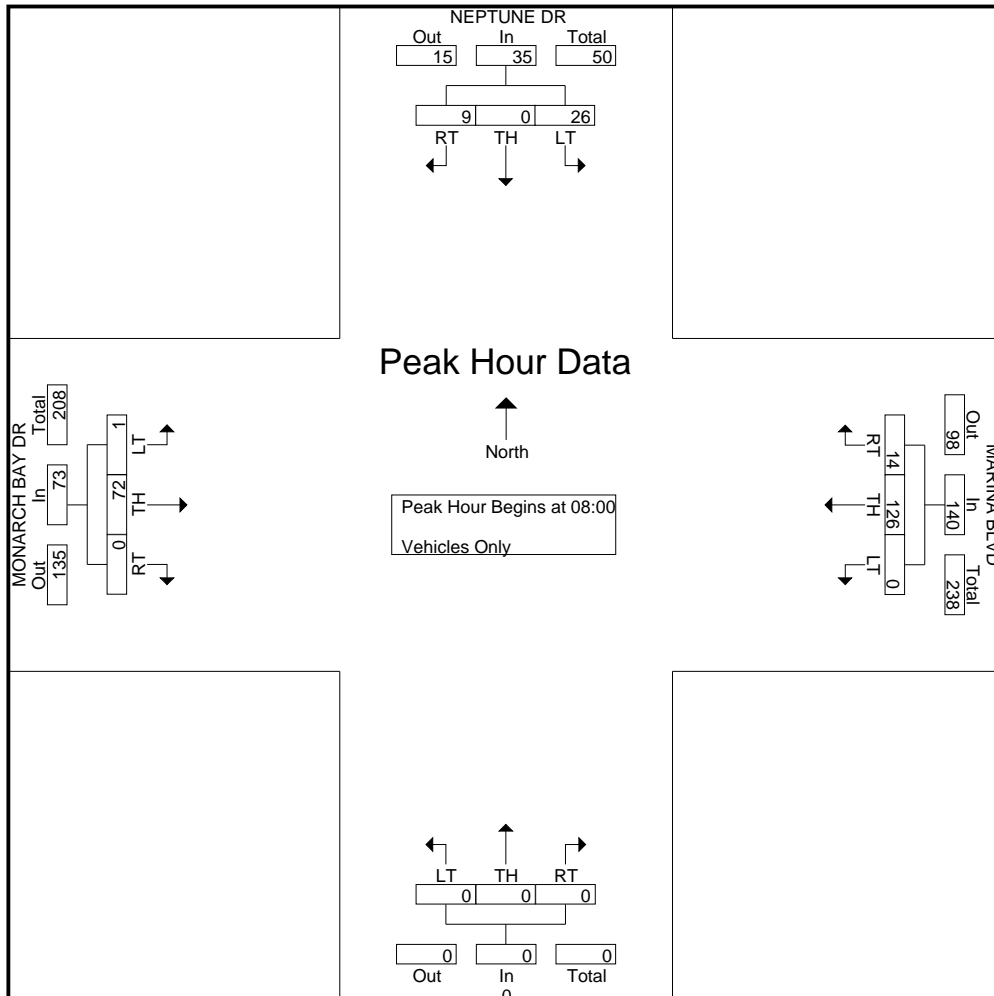
File Name : neptune-marina-a
Site Code : 27
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | NEPTUNE DR Southbound | | | | MARINA BLVD Westbound | | | | 0 Northbound | | | | MONARCH BAY DR Eastbound | | | | Int. Total |
|--------------|--------------------------|----------|-----------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|-----------------------------|-----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 0 | 0 | 1 | 1 | 1 | 9 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 13 | 24 |
| 07:15 | 0 | 0 | 3 | 3 | 2 | 18 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 14 | 1 | 15 | 38 |
| 07:30 | 1 | 0 | 4 | 5 | 2 | 16 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 10 | 33 |
| 07:45 | 1 | 0 | 5 | 6 | 3 | 29 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 18 | 1 | 19 | 57 |
| Total | 2 | 0 | 13 | 15 | 8 | 72 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 55 | 2 | 57 | 152 |
| 08:00 | 3 | 0 | 14 | 17 | 6 | 24 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 19 | 1 | 20 | 67 |
| 08:15 | 3 | 0 | 5 | 8 | 4 | 34 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 11 | 57 |
| 08:30 | 2 | 0 | 3 | 5 | 2 | 27 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 23 | 57 |
| 08:45 | 1 | 0 | 4 | 5 | 2 | 41 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 19 | 67 |
| Total | 9 | 0 | 26 | 35 | 14 | 126 | 0 | 140 | 0 | 0 | 0 | 0 | 0 | 72 | 1 | 73 | 248 |
| Grand Total | 11 | 0 | 39 | 50 | 22 | 198 | 0 | 220 | 0 | 0 | 0 | 0 | 0 | 127 | 3 | 130 | 400 |
| Apprch % | 22 | 0 | 78 | | 10 | 90 | 0 | | 0 | 0 | 0 | 0 | 0 | 97.7 | 2.3 | | |
| Total % | 2.8 | 0 | 9.8 | 12.5 | 5.5 | 49.5 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 31.8 | 0.8 | 32.5 | |

| Start Time | NEPTUNE DR Southbound | | | | MARINA BLVD Westbound | | | | 0 Northbound | | | | MONARCH BAY DR Eastbound | | | | Int. Total |
|---------------------|--------------------------|----------|-----------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|-----------------------------|-----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 08:00 | 3 | 0 | 14 | 17 | 6 | 24 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 19 | 1 | 20 | 67 |
| 08:15 | 3 | 0 | 5 | 8 | 4 | 34 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 11 | 57 |
| 08:30 | 2 | 0 | 3 | 5 | 2 | 27 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 23 | 57 |
| 08:45 | 1 | 0 | 4 | 5 | 2 | 41 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 19 | 67 |
| Total Volume | 9 | 0 | 26 | 35 | 14 | 126 | 0 | 140 | 0 | 0 | 0 | 0 | 0 | 72 | 1 | 73 | 248 |
| % App. Total | 25.7 | 0 | 74.3 | | 10 | 90 | 0 | | 0 | 0 | 0 | 0 | 0 | 98.6 | 1.4 | | |
| PHF | .750 | .000 | .464 | .515 | .583 | .768 | .000 | .814 | .000 | .000 | .000 | .000 | .000 | .783 | .250 | .793 | .925 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 08:00



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

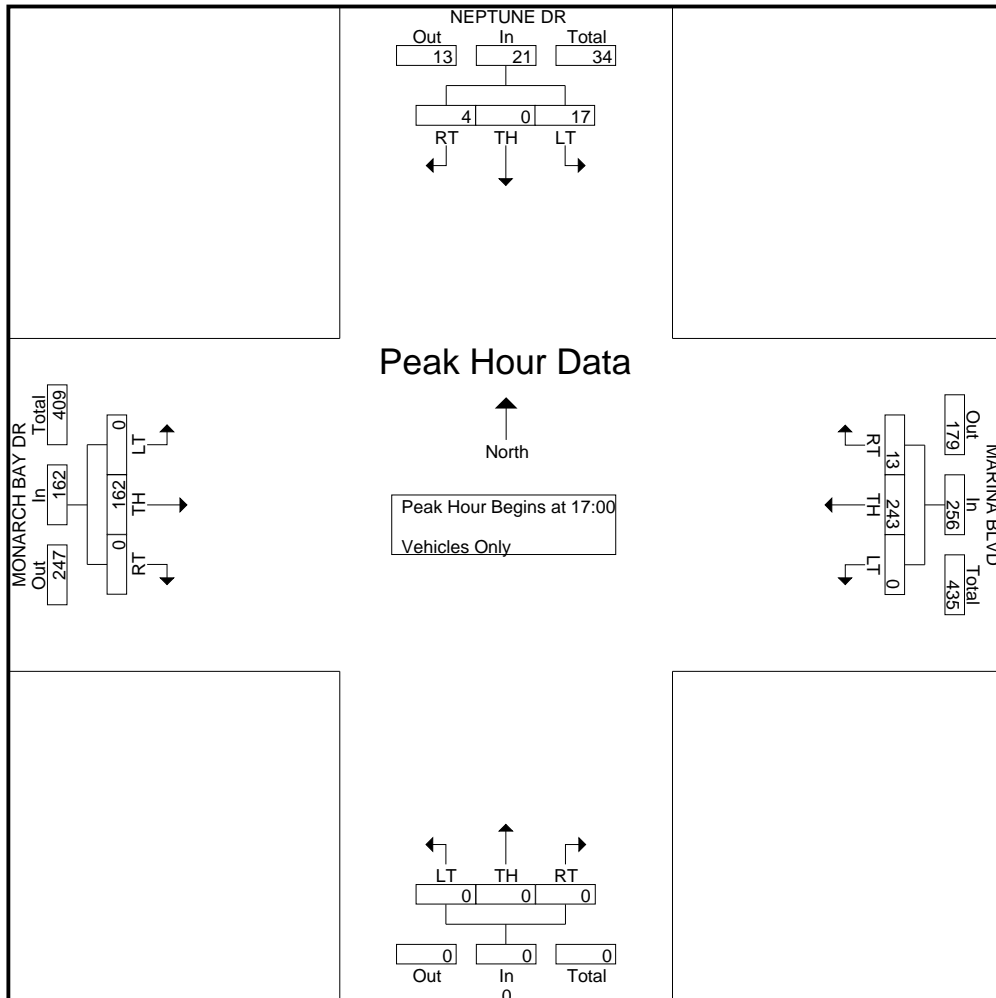
File Name : neptune-marina-p
Site Code : 27
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | NEPTUNE DR Southbound | | | | MARINA BLVD Westbound | | | | 0 Northbound | | | | MONARCH BAY DR Eastbound | | | | Int. Total |
|--------------------|--------------------------|----------|-----------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|-----------------------------|------------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 2 | 0 | 2 | 4 | 2 | 50 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 50 | 106 |
| 16:15 | 2 | 0 | 0 | 2 | 3 | 45 | 0 | 48 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 21 | 71 |
| 16:30 | 2 | 0 | 4 | 6 | 4 | 50 | 0 | 54 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 41 | 101 |
| 16:45 | 0 | 0 | 0 | 0 | 6 | 48 | 0 | 54 | 0 | 0 | 0 | 0 | 0 | 30 | 0 | 30 | 84 |
| Total | 6 | 0 | 6 | 12 | 15 | 193 | 0 | 208 | 0 | 0 | 0 | 0 | 0 | 142 | 0 | 142 | 362 |
| 17:00 | 2 | 0 | 6 | 8 | 4 | 51 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 41 | 104 |
| 17:15 | 2 | 0 | 4 | 6 | 2 | 67 | 0 | 69 | 0 | 0 | 0 | 0 | 0 | 48 | 0 | 48 | 123 |
| 17:30 | 0 | 0 | 4 | 4 | 1 | 65 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 36 | 106 |
| 17:45 | 0 | 0 | 3 | 3 | 6 | 60 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 37 | 0 | 37 | 106 |
| Total | 4 | 0 | 17 | 21 | 13 | 243 | 0 | 256 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 162 | 439 |
| Grand Total | 10 | 0 | 23 | 33 | 28 | 436 | 0 | 464 | 0 | 0 | 0 | 0 | 0 | 304 | 0 | 304 | 801 |
| Apprch % | 30.3 | 0 | 69.7 | | 6 | 94 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| Total % | 1.2 | 0 | 2.9 | 4.1 | 3.5 | 54.4 | 0 | 57.9 | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 38 | |

| Start Time | NEPTUNE DR Southbound | | | | MARINA BLVD Westbound | | | | 0 Northbound | | | | MONARCH BAY DR Eastbound | | | | Int. Total |
|---------------------|--------------------------|----------|-----------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|-----------------------------|------------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 17:00 | 2 | 0 | 6 | 8 | 4 | 51 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 41 | 104 |
| 17:15 | 2 | 0 | 4 | 6 | 2 | 67 | 0 | 69 | 0 | 0 | 0 | 0 | 0 | 48 | 0 | 48 | 123 |
| 17:30 | 0 | 0 | 4 | 4 | 1 | 65 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 36 | 106 |
| 17:45 | 0 | 0 | 3 | 3 | 6 | 60 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 37 | 0 | 37 | 106 |
| Total Volume | 4 | 0 | 17 | 21 | 13 | 243 | 0 | 256 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 162 | 439 |
| % App. Total | 19 | 0 | 81 | | 5.1 | 94.9 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| PHF | .500 | .000 | .708 | .656 | .542 | .907 | .000 | .928 | .000 | .000 | .000 | .000 | .000 | .844 | .000 | .844 | .892 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 17:00



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : neptune-marina-s
Site Code : 27
Start Date : 5/18/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | NEPTUNE DR Southbound | | | | MARINA BLVD Westbound | | | | 0 Northbound | | | | MONARCH BAY DR Eastbound | | | | Int. Total |
|--------------------|--------------------------|----------|-----------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|-----------------------------|------------|----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 1 | 0 | 1 | 2 | 1 | 49 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 40 | 92 |
| 10:15 | 1 | 0 | 6 | 7 | 1 | 40 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 31 | 0 | 31 | 79 |
| 10:30 | 0 | 0 | 0 | 0 | 1 | 56 | 0 | 57 | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 32 | 89 |
| 10:45 | 0 | 0 | 4 | 4 | 1 | 43 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 26 | 0 | 26 | 74 |
| Total | 2 | 0 | 11 | 13 | 4 | 188 | 0 | 192 | 0 | 0 | 0 | 0 | 0 | 129 | 0 | 129 | 334 |
| 11:00 | 1 | 0 | 7 | 8 | 7 | 38 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 44 | 97 |
| 11:15 | 1 | 0 | 3 | 4 | 4 | 41 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 27 | 76 |
| 11:30 | 0 | 0 | 2 | 2 | 2 | 56 | 0 | 58 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 40 | 100 |
| 11:45 | 3 | 0 | 3 | 6 | 5 | 44 | 0 | 49 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 36 | 91 |
| Total | 5 | 0 | 15 | 20 | 18 | 179 | 0 | 197 | 0 | 0 | 0 | 0 | 0 | 147 | 0 | 147 | 364 |
| 12:00 | 3 | 0 | 7 | 10 | 4 | 54 | 0 | 58 | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 49 | 117 |
| 12:15 | 0 | 0 | 5 | 5 | 6 | 57 | 0 | 63 | 0 | 0 | 0 | 0 | 0 | 55 | 0 | 55 | 123 |
| 12:30 | 1 | 0 | 2 | 3 | 8 | 42 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 49 | 102 |
| 12:45 | 1 | 0 | 5 | 6 | 4 | 52 | 0 | 56 | 0 | 0 | 0 | 0 | 0 | 47 | 0 | 47 | 109 |
| Total | 5 | 0 | 19 | 24 | 22 | 205 | 0 | 227 | 0 | 0 | 0 | 0 | 0 | 200 | 0 | 200 | 451 |
| 13:00 | 0 | 0 | 2 | 2 | 2 | 49 | 0 | 51 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 41 | 94 |
| 13:15 | 1 | 0 | 1 | 2 | 8 | 58 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 46 | 114 |
| 13:30 | 1 | 0 | 3 | 4 | 9 | 41 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 37 | 0 | 37 | 91 |
| 13:45 | 1 | 0 | 3 | 4 | 6 | 59 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 45 | 0 | 45 | 114 |
| Total | 3 | 0 | 9 | 12 | 25 | 207 | 0 | 232 | 0 | 0 | 0 | 0 | 0 | 169 | 0 | 169 | 413 |
| Grand Total | 15 | 0 | 54 | 69 | 69 | 779 | 0 | 848 | 0 | 0 | 0 | 0 | 0 | 645 | 0 | 645 | 1562 |
| Apprch % | 21.7 | 0 | 78.3 | | 8.1 | 91.9 | 0 | | 0 | 0 | 0 | 0 | 0 | 100 | 0 | | |
| Total % | 1 | 0 | 3.5 | 4.4 | 4.4 | 49.9 | 0 | 54.3 | 0 | 0 | 0 | 0 | 0 | 41.3 | 0 | 41.3 | |

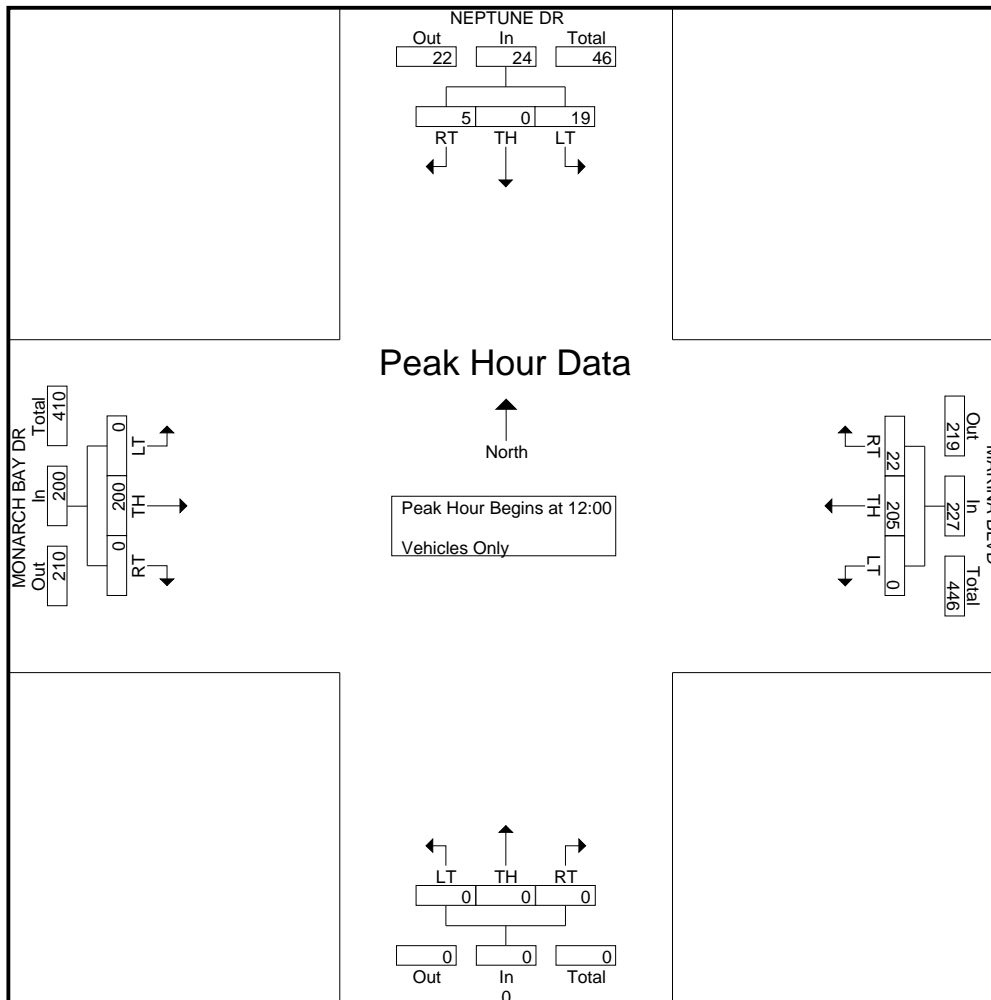
| Start Time | NEPTUNE DR Southbound | | | | MARINA BLVD Westbound | | | | 0 Northbound | | | | MONARCH BAY DR Eastbound | | | | Int. Total |
|---|--------------------------|----------|-----------|------------|--------------------------|------------|----------|------------|-----------------|----------|----------|------------|-----------------------------|------------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:00 | | | | | | | | | | | | | | | | | |
| 12:00 | 3 | 0 | 7 | 10 | 4 | 54 | 0 | 58 | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 49 | 117 |
| 12:15 | 0 | 0 | 5 | 5 | 6 | 57 | 0 | 63 | 0 | 0 | 0 | 0 | 0 | 55 | 0 | 55 | 123 |
| 12:30 | 1 | 0 | 2 | 3 | 8 | 42 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 49 | 102 |
| 12:45 | 1 | 0 | 5 | 6 | 4 | 52 | 0 | 56 | 0 | 0 | 0 | 0 | 0 | 47 | 0 | 47 | 109 |
| Total Volume | 5 | 0 | 19 | 24 | 22 | 205 | 0 | 227 | 0 | 0 | 0 | 0 | 0 | 200 | 0 | 200 | 451 |
| % App. Total | 20.8 | 0 | 79.2 | | 9.7 | 90.3 | 0 | | 0 | 0 | 0 | 0 | 0 | 100 | 0 | | |
| PHF | .417 | .000 | .679 | .600 | .688 | .899 | .000 | .901 | .000 | .000 | .000 | .000 | .000 | .909 | .000 | .909 | .917 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : neptune-marina-s
Site Code : 27
Start Date : 5/18/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

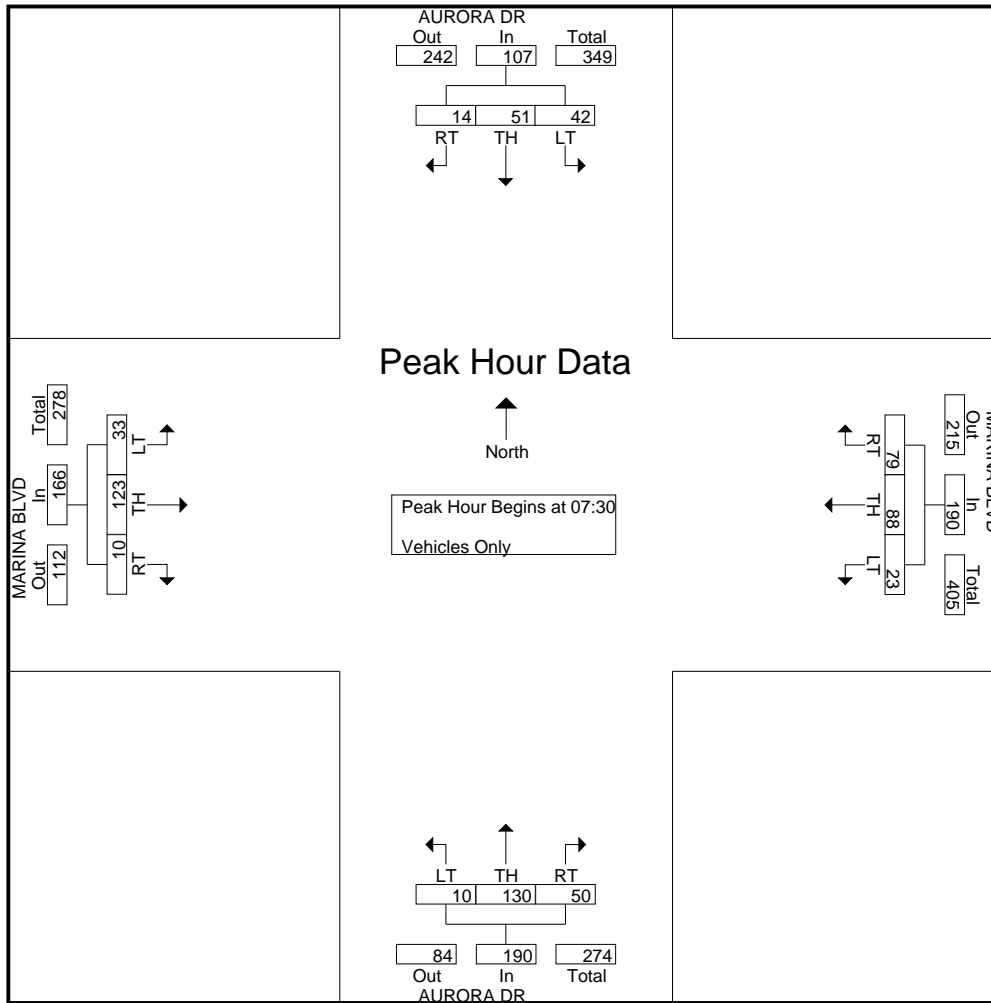
File Name : aurora-marina-a
Site Code : 26
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | AURORA DR Southbound | | | | MARINA BLVD Westbound | | | | AURORA DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|----------------------|-----------|-----------|------------|-----------------------|------------|-----------|------------|----------------------|------------|-----------|------------|-----------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 2 | 1 | 3 | 6 | 2 | 12 | 0 | 14 | 4 | 6 | 0 | 10 | 2 | 19 | 3 | 24 | 54 |
| 07:15 | 3 | 2 | 5 | 10 | 6 | 10 | 2 | 18 | 8 | 11 | 2 | 21 | 1 | 32 | 8 | 41 | 90 |
| 07:30 | 3 | 8 | 5 | 16 | 17 | 13 | 1 | 31 | 13 | 25 | 3 | 41 | 3 | 37 | 7 | 47 | 135 |
| 07:45 | 2 | 6 | 14 | 22 | 21 | 26 | 1 | 48 | 14 | 35 | 2 | 51 | 2 | 28 | 9 | 39 | 160 |
| Total | 10 | 17 | 27 | 54 | 46 | 61 | 4 | 111 | 39 | 77 | 7 | 123 | 8 | 116 | 27 | 151 | 439 |
| 08:00 | 6 | 14 | 12 | 32 | 34 | 24 | 9 | 67 | 11 | 62 | 3 | 76 | 3 | 31 | 14 | 48 | 223 |
| 08:15 | 3 | 23 | 11 | 37 | 7 | 25 | 12 | 44 | 12 | 8 | 2 | 22 | 2 | 27 | 3 | 32 | 135 |
| 08:30 | 8 | 3 | 3 | 14 | 6 | 23 | 5 | 34 | 7 | 5 | 1 | 13 | 1 | 10 | 8 | 19 | 80 |
| 08:45 | 4 | 1 | 4 | 9 | 2 | 32 | 11 | 45 | 5 | 5 | 0 | 10 | 1 | 18 | 4 | 23 | 87 |
| Total | 21 | 41 | 30 | 92 | 49 | 104 | 37 | 190 | 35 | 80 | 6 | 121 | 7 | 86 | 29 | 122 | 525 |
| Grand Total | 31 | 58 | 57 | 146 | 95 | 165 | 41 | 301 | 74 | 157 | 13 | 244 | 15 | 202 | 56 | 273 | 964 |
| Apprch % | 21.2 | 39.7 | 39 | 31.6 | 54.8 | 13.6 | 30.3 | 30.3 | 64.3 | 5.3 | 5.5 | 5.5 | 74 | 20.5 | 21 | 28.3 | |
| Total % | 3.2 | 6 | 5.9 | 15.1 | 9.9 | 17.1 | 4.3 | 31.2 | 7.7 | 16.3 | 1.3 | 25.3 | 1.6 | 21 | 5.8 | 28.3 | |

| Start Time | AURORA DR Southbound | | | | MARINA BLVD Westbound | | | | AURORA DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|---------------------|----------------------|-----------|-----------|------------|-----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|-----------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 3 | 8 | 5 | 16 | 17 | 13 | 1 | 31 | 13 | 25 | 3 | 41 | 3 | 37 | 7 | 47 | 135 |
| 07:45 | 2 | 6 | 14 | 22 | 21 | 26 | 1 | 48 | 14 | 35 | 2 | 51 | 2 | 28 | 9 | 39 | 160 |
| 08:00 | 6 | 14 | 12 | 32 | 34 | 24 | 9 | 67 | 11 | 62 | 3 | 76 | 3 | 31 | 14 | 48 | 223 |
| 08:15 | 3 | 23 | 11 | 37 | 7 | 25 | 12 | 44 | 12 | 8 | 2 | 22 | 2 | 27 | 3 | 32 | 135 |
| Total Volume | 14 | 51 | 42 | 107 | 79 | 88 | 23 | 190 | 50 | 130 | 10 | 190 | 10 | 123 | 33 | 166 | 653 |
| % App. Total | 13.1 | 47.7 | 39.3 | 41.6 | 46.3 | 12.1 | 26.3 | 26.3 | 68.4 | 5.3 | 6 | 6 | 74.1 | 19.9 | 8.33 | 8.33 | |
| PHF | .583 | .554 | .750 | .723 | .581 | .846 | .479 | .709 | .893 | .524 | .833 | .625 | .833 | .831 | .589 | .865 | .732 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

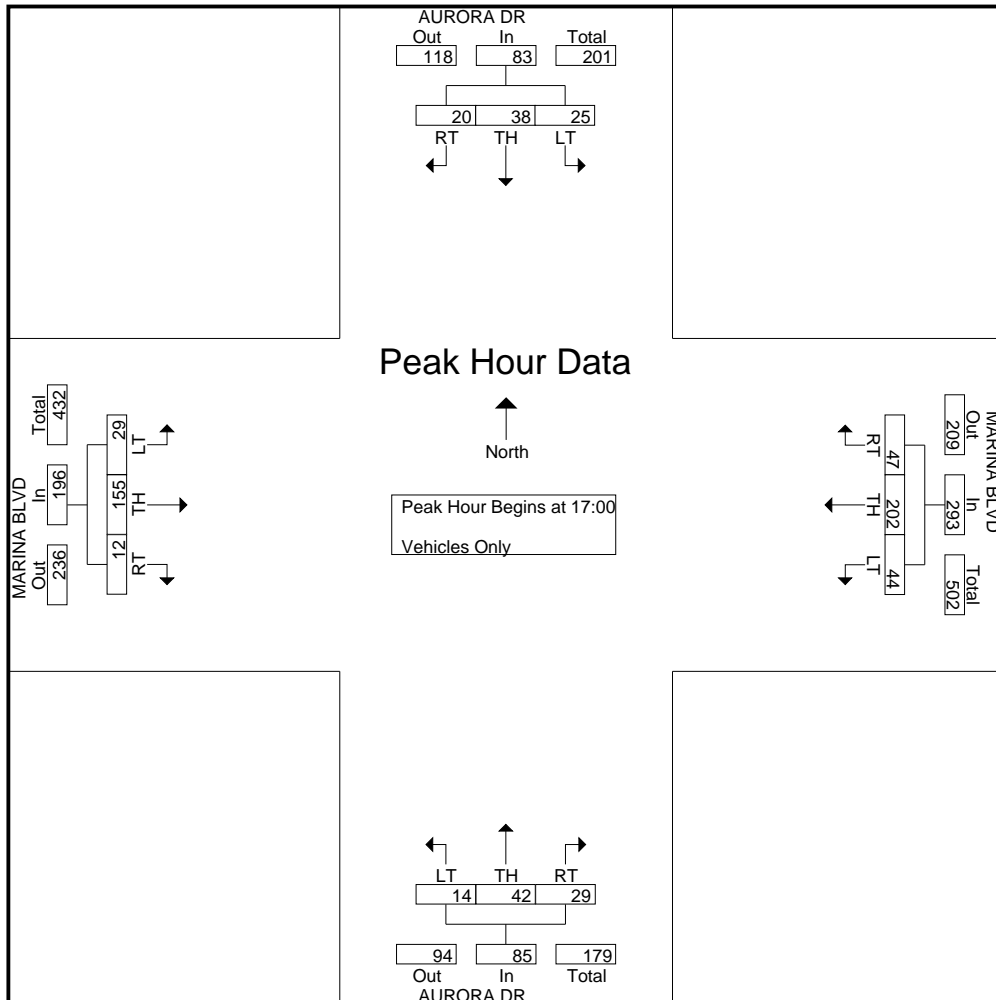
File Name : aurora-marina-p
Site Code : 26
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | AURORA DR Southbound | | | | MARINA BLVD Westbound | | | | AURORA DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|----------------------|-----------|-----------|------------|-----------------------|------------|-----------|------------|----------------------|-----------|-----------|------------|-----------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 5 | 10 | 5 | 20 | 4 | 41 | 5 | 50 | 8 | 6 | 4 | 18 | 4 | 42 | 5 | 51 | 139 |
| 16:15 | 6 | 7 | 3 | 16 | 4 | 45 | 10 | 59 | 4 | 7 | 0 | 11 | 2 | 28 | 2 | 32 | 118 |
| 16:30 | 9 | 8 | 5 | 22 | 6 | 51 | 11 | 68 | 6 | 1 | 4 | 11 | 4 | 36 | 3 | 43 | 144 |
| 16:45 | 5 | 11 | 4 | 20 | 7 | 57 | 11 | 75 | 3 | 7 | 1 | 11 | 2 | 30 | 4 | 36 | 142 |
| Total | 25 | 36 | 17 | 78 | 21 | 194 | 37 | 252 | 21 | 21 | 9 | 51 | 12 | 136 | 14 | 162 | 543 |
| 17:00 | 6 | 7 | 4 | 17 | 7 | 44 | 7 | 58 | 8 | 5 | 4 | 17 | 2 | 35 | 6 | 43 | 135 |
| 17:15 | 4 | 7 | 3 | 14 | 13 | 67 | 16 | 96 | 5 | 7 | 3 | 15 | 3 | 40 | 8 | 51 | 176 |
| 17:30 | 5 | 9 | 11 | 25 | 16 | 48 | 11 | 75 | 9 | 21 | 4 | 34 | 5 | 49 | 10 | 64 | 198 |
| 17:45 | 5 | 15 | 7 | 27 | 11 | 43 | 10 | 64 | 7 | 9 | 3 | 19 | 2 | 31 | 5 | 38 | 148 |
| Total | 20 | 38 | 25 | 83 | 47 | 202 | 44 | 293 | 29 | 42 | 14 | 85 | 12 | 155 | 29 | 196 | 657 |
| Grand Total | 45 | 74 | 42 | 161 | 68 | 396 | 81 | 545 | 50 | 63 | 23 | 136 | 24 | 291 | 43 | 358 | 1200 |
| Apprch % | 28 | 46 | 26.1 | | 12.5 | 72.7 | 14.9 | | 36.8 | 46.3 | 16.9 | | 6.7 | 81.3 | 12 | | |
| Total % | 3.8 | 6.2 | 3.5 | 13.4 | 5.7 | 33 | 6.8 | 45.4 | 4.2 | 5.2 | 1.9 | 11.3 | 2 | 24.2 | 3.6 | 29.8 | |

| Start Time | AURORA DR Southbound | | | | MARINA BLVD Westbound | | | | AURORA DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|---------------------|----------------------|-----------|-----------|------------|-----------------------|------------|-----------|------------|----------------------|-----------|-----------|------------|-----------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 17:00 | 6 | 7 | 4 | 17 | 7 | 44 | 7 | 58 | 8 | 5 | 4 | 17 | 2 | 35 | 6 | 43 | 135 |
| 17:15 | 4 | 7 | 3 | 14 | 13 | 67 | 16 | 96 | 5 | 7 | 3 | 15 | 3 | 40 | 8 | 51 | 176 |
| 17:30 | 5 | 9 | 11 | 25 | 16 | 48 | 11 | 75 | 9 | 21 | 4 | 34 | 5 | 49 | 10 | 64 | 198 |
| 17:45 | 5 | 15 | 7 | 27 | 11 | 43 | 10 | 64 | 7 | 9 | 3 | 19 | 2 | 31 | 5 | 38 | 148 |
| Total Volume | 20 | 38 | 25 | 83 | 47 | 202 | 44 | 293 | 29 | 42 | 14 | 85 | 12 | 155 | 29 | 196 | 657 |
| % App. Total | 24.1 | 45.8 | 30.1 | | 16 | 68.9 | 15 | | 34.1 | 49.4 | 16.5 | | 6.1 | 79.1 | 14.8 | | |
| PHF | .833 | .633 | .568 | .769 | .734 | .754 | .688 | .763 | .806 | .500 | .875 | .625 | .600 | .791 | .725 | .766 | .830 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 17:00



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : aurora-marina-s
Site Code : 26
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | AURORA DR Southbound | | | | MARINA BLVD Westbound | | | | AURORA DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|-------------|----------------------|-----|------|------------|-----------------------|------|------|------------|----------------------|------|------|------------|-----------------------|------|-----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 4 | 3 | 9 | 16 | 4 | 29 | 4 | 37 | 10 | 4 | 3 | 17 | 1 | 46 | 2 | 49 | 119 |
| 10:15 | 3 | 1 | 2 | 6 | 2 | 39 | 1 | 42 | 6 | 3 | 2 | 11 | 3 | 43 | 2 | 48 | 107 |
| 10:30 | 1 | 4 | 3 | 8 | 1 | 43 | 8 | 52 | 12 | 2 | 0 | 14 | 3 | 46 | 4 | 53 | 127 |
| 10:45 | 8 | 3 | 1 | 12 | 2 | 43 | 5 | 50 | 7 | 3 | 0 | 10 | 1 | 47 | 3 | 51 | 123 |
| Total | 16 | 11 | 15 | 42 | 9 | 154 | 18 | 181 | 35 | 12 | 5 | 52 | 8 | 182 | 11 | 201 | 476 |
| 11:00 | 6 | 2 | 5 | 13 | 3 | 54 | 3 | 60 | 12 | 4 | 2 | 18 | 2 | 37 | 3 | 42 | 133 |
| 11:15 | 7 | 3 | 5 | 15 | 3 | 51 | 10 | 64 | 12 | 3 | 2 | 17 | 0 | 56 | 1 | 57 | 153 |
| 11:30 | 7 | 8 | 2 | 17 | 5 | 44 | 12 | 61 | 9 | 4 | 2 | 15 | 2 | 47 | 2 | 51 | 144 |
| 11:45 | 6 | 6 | 4 | 16 | 3 | 53 | 7 | 63 | 9 | 4 | 0 | 13 | 1 | 49 | 6 | 56 | 148 |
| Total | 26 | 19 | 16 | 61 | 14 | 202 | 32 | 248 | 42 | 15 | 6 | 63 | 5 | 189 | 12 | 206 | 578 |
| 12:00 | 2 | 6 | 0 | 8 | 2 | 75 | 2 | 79 | 5 | 6 | 1 | 12 | 2 | 41 | 6 | 49 | 148 |
| 12:15 | 5 | 1 | 3 | 9 | 3 | 66 | 8 | 77 | 8 | 2 | 2 | 12 | 2 | 61 | 4 | 67 | 165 |
| 12:30 | 2 | 4 | 6 | 12 | 9 | 71 | 4 | 84 | 10 | 4 | 1 | 15 | 5 | 45 | 4 | 54 | 165 |
| 12:45 | 4 | 3 | 6 | 13 | 5 | 42 | 6 | 53 | 4 | 2 | 2 | 8 | 1 | 48 | 1 | 50 | 124 |
| Total | 13 | 14 | 15 | 42 | 19 | 254 | 20 | 293 | 27 | 14 | 6 | 47 | 10 | 195 | 15 | 220 | 602 |
| 13:00 | 2 | 2 | 1 | 5 | 7 | 51 | 6 | 64 | 9 | 4 | 2 | 15 | 1 | 51 | 4 | 56 | 140 |
| 13:15 | 5 | 1 | 2 | 8 | 5 | 60 | 9 | 74 | 6 | 4 | 1 | 11 | 0 | 51 | 3 | 54 | 147 |
| 13:30 | 4 | 5 | 4 | 13 | 9 | 62 | 5 | 76 | 2 | 4 | 1 | 7 | 0 | 47 | 7 | 54 | 150 |
| 13:45 | 6 | 5 | 2 | 13 | 4 | 61 | 12 | 77 | 9 | 7 | 2 | 18 | 2 | 58 | 2 | 62 | 170 |
| Total | 17 | 13 | 9 | 39 | 25 | 234 | 32 | 291 | 26 | 19 | 6 | 51 | 3 | 207 | 16 | 226 | 607 |
| Grand Total | 72 | 57 | 55 | 184 | 67 | 844 | 102 | 1013 | 130 | 60 | 23 | 213 | 26 | 773 | 54 | 853 | 2263 |
| Apprch % | 39.1 | 31 | 29.9 | | 6.6 | 83.3 | 10.1 | | 61 | 28.2 | 10.8 | | 3 | 90.6 | 6.3 | | |
| Total % | 3.2 | 2.5 | 2.4 | 8.1 | 3 | 37.3 | 4.5 | 44.8 | 5.7 | 2.7 | 1 | 9.4 | 1.1 | 34.2 | 2.4 | 37.7 | |

| Start Time | AURORA DR Southbound | | | | MARINA BLVD Westbound | | | | AURORA DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------|----------------------|------|------|------------|-----------------------|------|------|------------|----------------------|------|------|------------|-----------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 11:45 | 6 | 6 | 4 | 16 | 3 | 53 | 7 | 63 | 9 | 4 | 0 | 13 | 1 | 49 | 6 | 56 | 148 |
| 12:00 | 2 | 6 | 0 | 8 | 2 | 75 | 2 | 79 | 5 | 6 | 1 | 12 | 2 | 41 | 6 | 49 | 148 |
| 12:15 | 5 | 1 | 3 | 9 | 3 | 66 | 8 | 77 | 8 | 2 | 2 | 12 | 2 | 61 | 4 | 67 | 165 |
| 12:30 | 2 | 4 | 6 | 12 | 9 | 71 | 4 | 84 | 10 | 4 | 1 | 15 | 5 | 45 | 4 | 54 | 165 |
| Total Volume | 15 | 17 | 13 | 45 | 17 | 265 | 21 | 303 | 32 | 16 | 4 | 52 | 10 | 196 | 20 | 226 | 626 |
| % App. Total | 33.3 | 37.8 | 28.9 | | 5.6 | 87.5 | 6.9 | | 61.5 | 30.8 | 7.7 | | 4.4 | 86.7 | 8.8 | | |
| PHF | .625 | .708 | .542 | .703 | .472 | .883 | .656 | .902 | .800 | .667 | .500 | .867 | .500 | .803 | .833 | .843 | .948 |

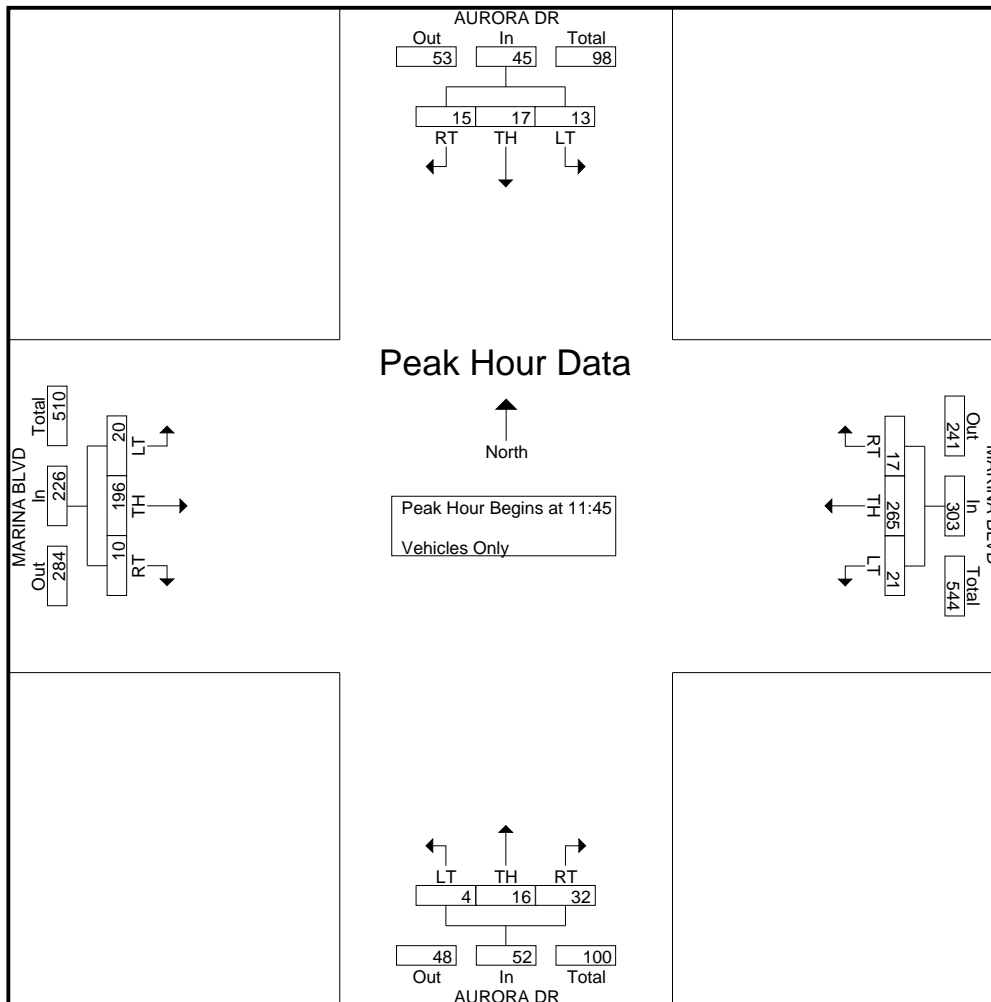
Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 11:45

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : aurora-marina-s
Site Code : 26
Start Date : 2/2/2013
Page No : 2



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

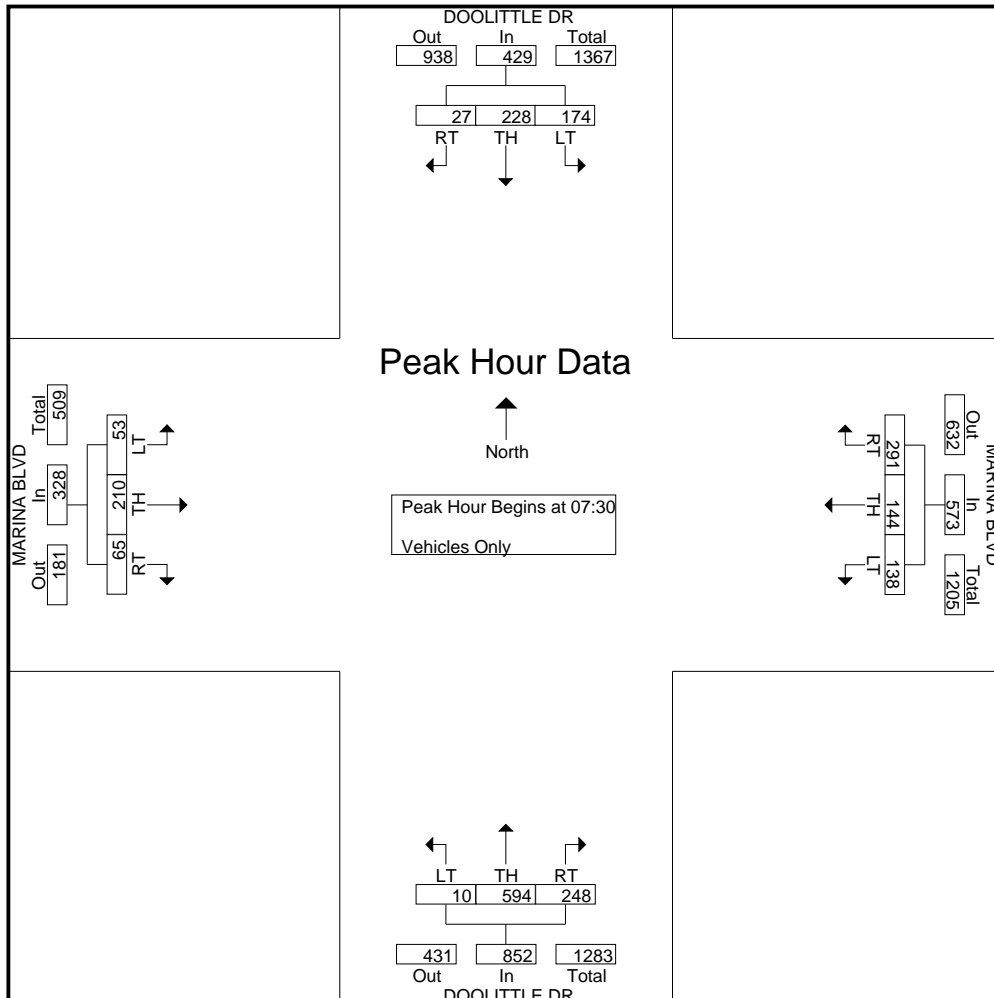
File Name : doolittle-marina-a
Site Code : 9
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR Southbound | | | | MARINA BLVD Westbound | | | | DOOLITTLE DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|----------------------------|------|------|------------|--------------------------|------|------|------------|----------------------------|------|-----|------------|--------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 3 | 33 | 34 | 70 | 45 | 14 | 20 | 79 | 41 | 62 | 1 | 104 | 1 | 28 | 4 | 33 | 286 |
| 07:15 | 2 | 36 | 26 | 64 | 50 | 13 | 26 | 89 | 52 | 95 | 2 | 149 | 4 | 48 | 8 | 60 | 362 |
| 07:30 | 3 | 39 | 42 | 84 | 61 | 26 | 31 | 118 | 72 | 137 | 2 | 211 | 14 | 61 | 14 | 89 | 502 |
| 07:45 | 3 | 55 | 38 | 96 | 86 | 45 | 37 | 168 | 75 | 176 | 3 | 254 | 11 | 38 | 19 | 68 | 586 |
| Total | 11 | 163 | 140 | 314 | 242 | 98 | 114 | 454 | 240 | 470 | 8 | 718 | 30 | 175 | 45 | 250 | 1736 |
| 08:00 | 12 | 65 | 52 | 129 | 79 | 36 | 32 | 147 | 64 | 171 | 4 | 239 | 13 | 62 | 9 | 84 | 599 |
| 08:15 | 9 | 69 | 42 | 120 | 65 | 37 | 38 | 140 | 37 | 110 | 1 | 148 | 27 | 49 | 11 | 87 | 495 |
| 08:30 | 7 | 55 | 50 | 112 | 69 | 21 | 24 | 114 | 50 | 113 | 6 | 169 | 6 | 23 | 7 | 36 | 431 |
| 08:45 | 13 | 66 | 36 | 115 | 85 | 21 | 40 | 146 | 47 | 90 | 1 | 138 | 3 | 21 | 9 | 33 | 432 |
| Total | 41 | 255 | 180 | 476 | 298 | 115 | 134 | 547 | 198 | 484 | 12 | 694 | 49 | 155 | 36 | 240 | 1957 |
| Grand Total | 52 | 418 | 320 | 790 | 540 | 213 | 248 | 1001 | 438 | 954 | 20 | 1412 | 79 | 330 | 81 | 490 | 3693 |
| Apprch % | 6.6 | 52.9 | 40.5 | | 53.9 | 21.3 | 24.8 | | 31 | 67.6 | 1.4 | | 16.1 | 67.3 | 16.5 | | |
| Total % | 1.4 | 11.3 | 8.7 | 21.4 | 14.6 | 5.8 | 6.7 | 27.1 | 11.9 | 25.8 | 0.5 | 38.2 | 2.1 | 8.9 | 2.2 | 13.3 | |

| Start Time | DOOLITTLE DR Southbound | | | | MARINA BLVD Westbound | | | | DOOLITTLE DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------|----------------------------|-----------|-----------|------------|--------------------------|-----------|-----------|------------|----------------------------|------------|----------|------------|--------------------------|-----------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 3 | 39 | 42 | 84 | 61 | 26 | 31 | 118 | 72 | 137 | 2 | 211 | 14 | 61 | 14 | 89 | 502 |
| 07:45 | 3 | 55 | 38 | 96 | 86 | 45 | 37 | 168 | 75 | 176 | 3 | 254 | 11 | 38 | 19 | 68 | 586 |
| 08:00 | 12 | 65 | 52 | 129 | 79 | 36 | 32 | 147 | 64 | 171 | 4 | 239 | 13 | 62 | 9 | 84 | 599 |
| 08:15 | 9 | 69 | 42 | 120 | 65 | 37 | 38 | 140 | 37 | 110 | 1 | 148 | 27 | 49 | 11 | 87 | 495 |
| Total Volume | 27 | 228 | 174 | 429 | 291 | 144 | 138 | 573 | 248 | 594 | 10 | 852 | 65 | 210 | 53 | 328 | 2182 |
| % App. Total | 6.3 | 53.1 | 40.6 | | 50.8 | 25.1 | 24.1 | | 29.1 | 69.7 | 1.2 | | 19.8 | 64 | 16.2 | | |
| PHF | .563 | .826 | .837 | .831 | .846 | .800 | .908 | .853 | .827 | .844 | .625 | .839 | .602 | .847 | .697 | .921 | .911 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-marina-p
Site Code : 9
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

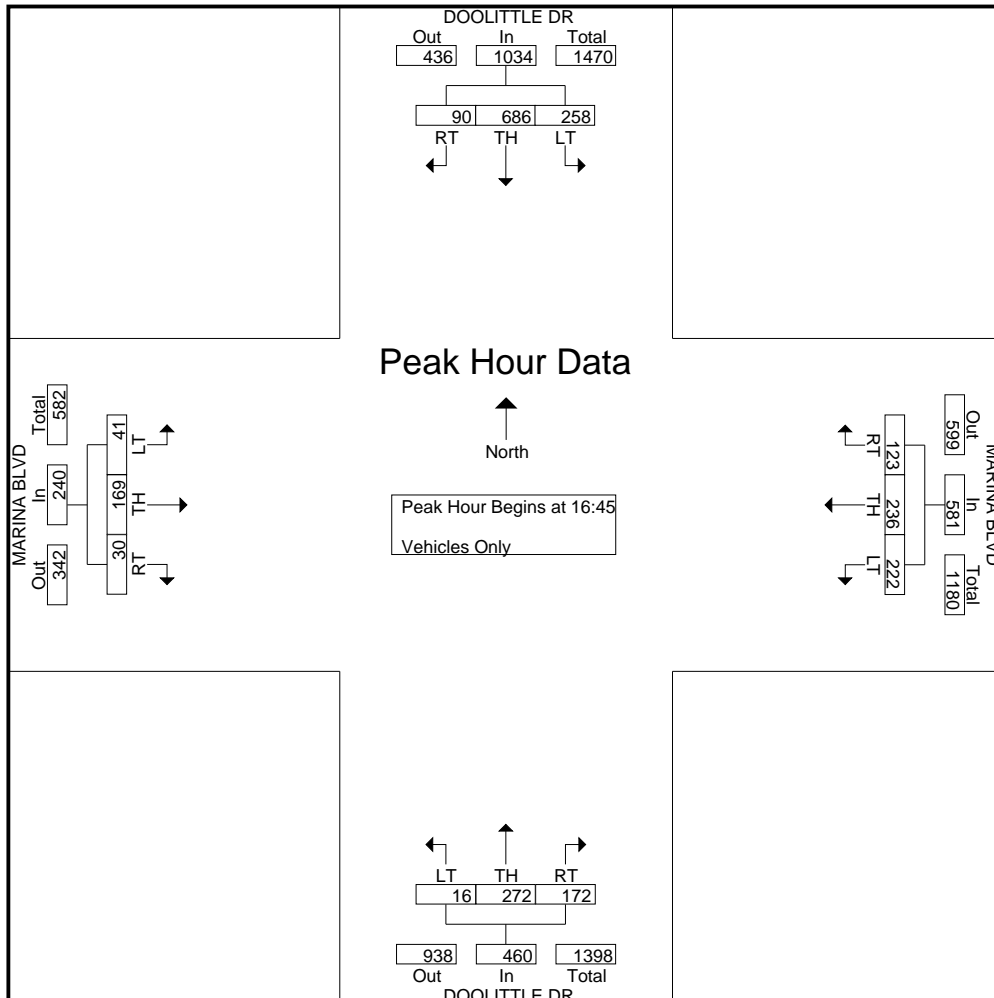
| Start Time | DOOLITTLE DR Southbound | | | | MARINA BLVD Westbound | | | | DOOLITTLE DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|----------------------------|-------------|------------|-------------|--------------------------|------------|------------|-------------|----------------------------|------------|-----------|------------|--------------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 16 | 117 | 53 | 186 | 27 | 46 | 37 | 110 | 53 | 61 | 2 | 116 | 4 | 51 | 15 | 70 | 482 |
| 16:15 | 15 | 116 | 58 | 189 | 37 | 54 | 43 | 134 | 30 | 78 | 5 | 113 | 4 | 32 | 13 | 49 | 485 |
| 16:30 | 16 | 140 | 72 | 228 | 34 | 57 | 55 | 146 | 35 | 70 | 5 | 110 | 5 | 38 | 15 | 58 | 542 |
| 16:45 | 20 | 160 | 60 | 240 | 24 | 56 | 47 | 127 | 47 | 70 | 1 | 118 | 6 | 31 | 13 | 50 | 535 |
| Total | 67 | 533 | 243 | 843 | 122 | 213 | 182 | 517 | 165 | 279 | 13 | 457 | 19 | 152 | 56 | 227 | 2044 |
| 17:00 | 18 | 145 | 65 | 228 | 39 | 50 | 49 | 138 | 40 | 72 | 5 | 117 | 5 | 48 | 5 | 58 | 541 |
| 17:15 | 26 | 213 | 73 | 312 | 34 | 76 | 70 | 180 | 46 | 65 | 6 | 117 | 9 | 43 | 8 | 60 | 669 |
| 17:30 | 26 | 168 | 60 | 254 | 26 | 54 | 56 | 136 | 39 | 65 | 4 | 108 | 10 | 47 | 15 | 72 | 570 |
| 17:45 | 20 | 127 | 64 | 211 | 34 | 51 | 39 | 124 | 43 | 64 | 5 | 112 | 5 | 38 | 13 | 56 | 503 |
| Total | 90 | 653 | 262 | 1005 | 133 | 231 | 214 | 578 | 168 | 266 | 20 | 454 | 29 | 176 | 41 | 246 | 2283 |
| Grand Total | 157 | 1186 | 505 | 1848 | 255 | 444 | 396 | 1095 | 333 | 545 | 33 | 911 | 48 | 328 | 97 | 473 | 4327 |
| Apprch % | 8.5 | 64.2 | 27.3 | | 23.3 | 40.5 | 36.2 | | 36.6 | 59.8 | 3.6 | | 10.1 | 69.3 | 20.5 | | |
| Total % | 3.6 | 27.4 | 11.7 | 42.7 | 5.9 | 10.3 | 9.2 | 25.3 | 7.7 | 12.6 | 0.8 | 21.1 | 1.1 | 7.6 | 2.2 | 10.9 | |

| Start Time | DOOLITTLE DR Southbound | | | App. Total | MARINA BLVD Westbound | | | App. Total | DOOLITTLE DR Northbound | | | App. Total | MARINA BLVD Eastbound | | | Int. Total |
|------------|----------------------------|----|----|------------|--------------------------|----|----|------------|----------------------------|----|----|------------|--------------------------|----|----|------------|
| | RT | TH | LT | | RT | TH | LT | | RT | TH | LT | | RT | TH | LT | |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:45

| | | | | | | | | | | | | | | | | | |
|--------------|-----------|------------|-----------|------------|-----------|-----------|-----------|------------|-----------|-----------|----------|------------|-----------|-----------|-----------|-----------|------------|
| 16:45 | 20 | 160 | 60 | 240 | 24 | 56 | 47 | 127 | 47 | 70 | 1 | 118 | 6 | 31 | 13 | 50 | 535 |
| 17:00 | 18 | 145 | 65 | 228 | 39 | 50 | 49 | 138 | 40 | 72 | 5 | 117 | 5 | 48 | 5 | 58 | 541 |
| 17:15 | 26 | 213 | 73 | 312 | 34 | 76 | 70 | 180 | 46 | 65 | 6 | 117 | 9 | 43 | 8 | 60 | 669 |
| 17:30 | 26 | 168 | 60 | 254 | 26 | 54 | 56 | 136 | 39 | 65 | 4 | 108 | 10 | 47 | 15 | 72 | 570 |
| Total Volume | 90 | 686 | 258 | 1034 | 123 | 236 | 222 | 581 | 172 | 272 | 16 | 460 | 30 | 169 | 41 | 240 | 2315 |
| % App. Total | 8.7 | 66.3 | 25 | | 21.2 | 40.6 | 38.2 | | 37.4 | 59.1 | 3.5 | | 12.5 | 70.4 | 17.1 | | |
| PHF | .865 | .805 | .884 | .829 | .788 | .776 | .793 | .807 | .915 | .944 | .667 | .975 | .750 | .880 | .683 | .833 | .865 |



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-marina-s
Site Code : 9
Start Date : 1/26/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR Southbound | | | | MARINA BLVD Westbound | | | | DOOLITTLE DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|-------------|----------------------------|------|------|------------|--------------------------|------|------|------------|----------------------------|------|-----|------------|--------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 10 | 52 | 21 | 83 | 20 | 41 | 29 | 90 | 38 | 37 | 2 | 77 | 1 | 36 | 10 | 47 | 297 |
| 10:15 | 14 | 54 | 23 | 91 | 14 | 49 | 39 | 102 | 41 | 50 | 1 | 92 | 4 | 44 | 13 | 61 | 346 |
| 10:30 | 5 | 45 | 23 | 73 | 20 | 42 | 32 | 94 | 42 | 56 | 3 | 101 | 4 | 57 | 12 | 73 | 341 |
| 10:45 | 15 | 45 | 32 | 92 | 24 | 45 | 33 | 102 | 47 | 49 | 3 | 99 | 2 | 40 | 8 | 50 | 343 |
| Total | 44 | 196 | 99 | 339 | 78 | 177 | 133 | 388 | 168 | 192 | 9 | 369 | 11 | 177 | 43 | 231 | 1327 |
| 11:00 | 7 | 52 | 38 | 97 | 23 | 66 | 40 | 129 | 39 | 49 | 1 | 89 | 2 | 53 | 13 | 68 | 383 |
| 11:15 | 6 | 48 | 35 | 89 | 25 | 50 | 42 | 117 | 30 | 42 | 2 | 74 | 3 | 44 | 12 | 59 | 339 |
| 11:30 | 19 | 55 | 43 | 117 | 31 | 41 | 39 | 111 | 49 | 43 | 11 | 103 | 7 | 44 | 14 | 65 | 396 |
| 11:45 | 13 | 63 | 45 | 121 | 24 | 44 | 44 | 112 | 38 | 57 | 4 | 99 | 6 | 47 | 17 | 70 | 402 |
| Total | 45 | 218 | 161 | 424 | 103 | 201 | 165 | 469 | 156 | 191 | 18 | 365 | 18 | 188 | 56 | 262 | 1520 |
| 12:00 | 17 | 51 | 38 | 106 | 18 | 60 | 43 | 121 | 38 | 52 | 1 | 91 | 6 | 63 | 19 | 88 | 406 |
| 12:15 | 16 | 40 | 37 | 93 | 29 | 80 | 38 | 147 | 44 | 48 | 2 | 94 | 6 | 51 | 14 | 71 | 405 |
| 12:30 | 24 | 70 | 35 | 129 | 23 | 71 | 33 | 127 | 38 | 58 | 4 | 100 | 7 | 59 | 15 | 81 | 437 |
| 12:45 | 18 | 58 | 28 | 104 | 27 | 70 | 44 | 141 | 44 | 60 | 3 | 107 | 5 | 48 | 15 | 68 | 420 |
| Total | 75 | 219 | 138 | 432 | 97 | 281 | 158 | 536 | 164 | 218 | 10 | 392 | 24 | 221 | 63 | 308 | 1668 |
| 13:00 | 17 | 68 | 30 | 115 | 26 | 75 | 41 | 142 | 34 | 44 | 7 | 85 | 6 | 54 | 16 | 76 | 418 |
| 13:15 | 13 | 42 | 41 | 96 | 26 | 86 | 45 | 157 | 39 | 50 | 4 | 93 | 5 | 58 | 20 | 83 | 429 |
| 13:30 | 14 | 74 | 27 | 115 | 26 | 68 | 51 | 145 | 44 | 52 | 4 | 100 | 8 | 60 | 14 | 82 | 442 |
| 13:45 | 20 | 67 | 39 | 126 | 34 | 87 | 53 | 174 | 56 | 57 | 2 | 115 | 10 | 62 | 15 | 87 | 502 |
| Total | 64 | 251 | 137 | 452 | 112 | 316 | 190 | 618 | 173 | 203 | 17 | 393 | 29 | 234 | 65 | 328 | 1791 |
| Grand Total | 228 | 884 | 535 | 1647 | 390 | 975 | 646 | 2011 | 661 | 804 | 54 | 1519 | 82 | 820 | 227 | 1129 | 6306 |
| Apprch % | 13.8 | 53.7 | 32.5 | | 19.4 | 48.5 | 32.1 | | 43.5 | 52.9 | 3.6 | | 7.3 | 72.6 | 20.1 | | |
| Total % | 3.6 | 14 | 8.5 | 26.1 | 6.2 | 15.5 | 10.2 | 31.9 | 10.5 | 12.7 | 0.9 | 24.1 | 1.3 | 13 | 3.6 | 17.9 | |

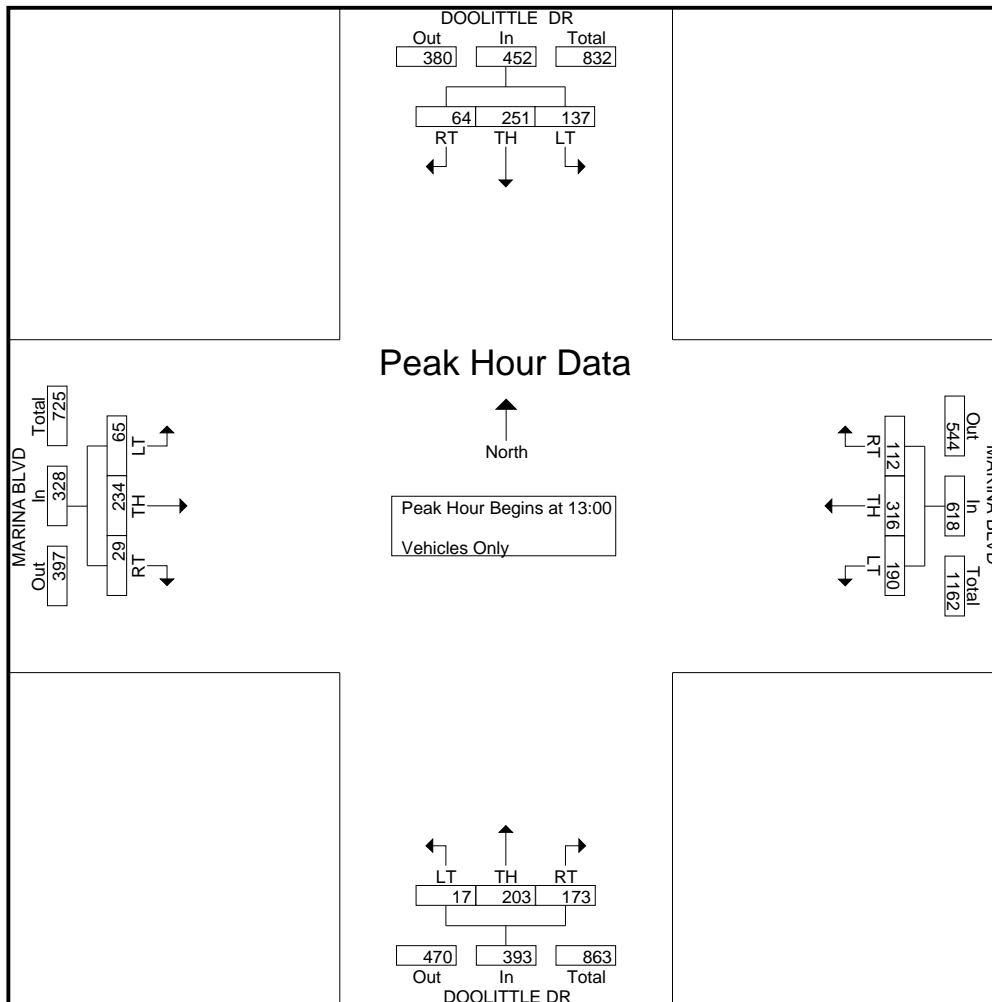
| Start Time | DOOLITTLE DR Southbound | | | | MARINA BLVD Westbound | | | | DOOLITTLE DR Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--|----------------------------|------|------|------------|--------------------------|------|------|------------|----------------------------|------|------|------------|--------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 13:00 | | | | | | | | | | | | | | | | | |
| 13:00 | 17 | 68 | 30 | 115 | 26 | 75 | 41 | 142 | 34 | 44 | 7 | 85 | 6 | 54 | 16 | 76 | 418 |
| 13:15 | 13 | 42 | 41 | 96 | 26 | 86 | 45 | 157 | 39 | 50 | 4 | 93 | 5 | 58 | 20 | 83 | 429 |
| 13:30 | 14 | 74 | 27 | 115 | 26 | 68 | 51 | 145 | 44 | 52 | 4 | 100 | 8 | 60 | 14 | 82 | 442 |
| 13:45 | 20 | 67 | 39 | 126 | 34 | 87 | 53 | 174 | 56 | 57 | 2 | 115 | 10 | 62 | 15 | 87 | 502 |
| Total Volume | 64 | 251 | 137 | 452 | 112 | 316 | 190 | 618 | 173 | 203 | 17 | 393 | 29 | 234 | 65 | 328 | 1791 |
| % App. Total | 14.2 | 55.5 | 30.3 | | 18.1 | 51.1 | 30.7 | | 44 | 51.7 | 4.3 | | 8.8 | 71.3 | 19.8 | | |
| PHF | .800 | .848 | .835 | .897 | .824 | .908 | .896 | .888 | .772 | .890 | .607 | .854 | .725 | .944 | .813 | .943 | .892 |

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-marina-s
Site Code : 9
Start Date : 1/26/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

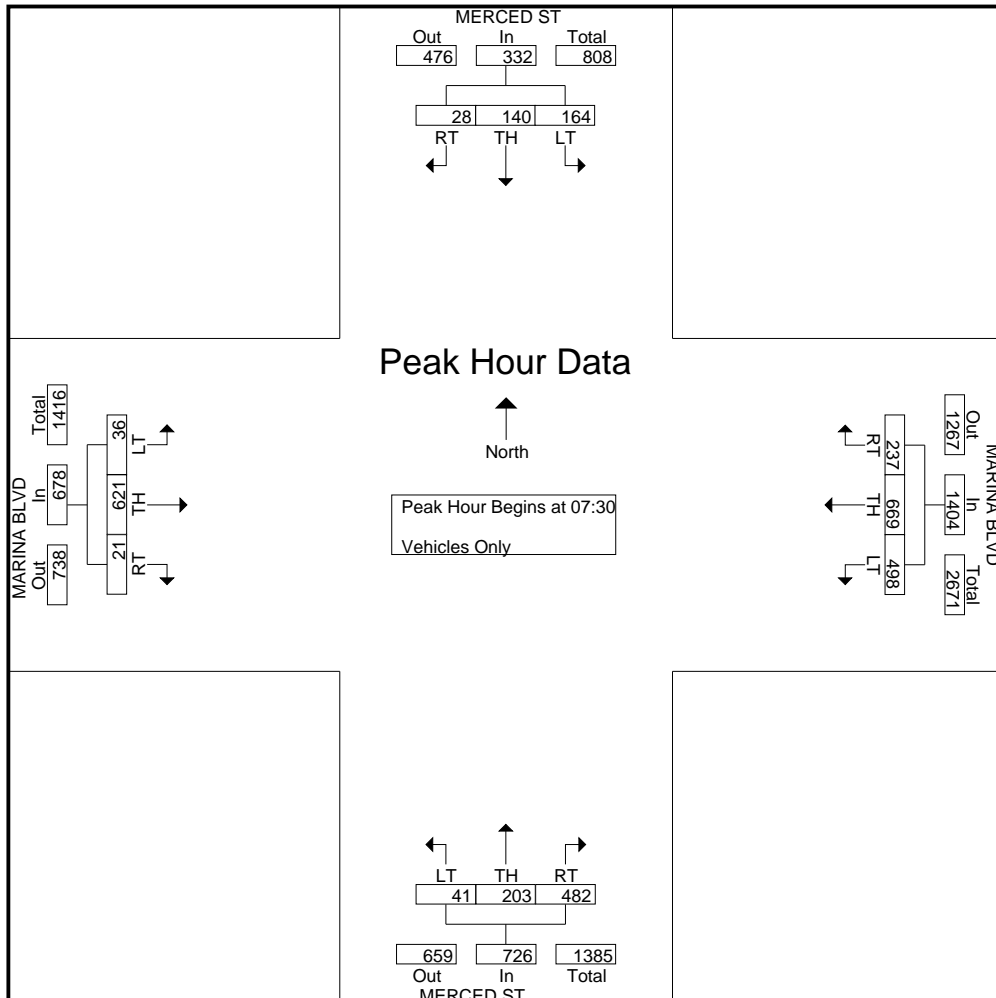
File Name : merced-marina-a
Site Code : 10
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MERCED ST Southbound | | | | MARINA BLVD Westbound | | | | MERCED ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|-------------------------|------------|------------|------------|--------------------------|-------------|------------|-------------|-------------------------|------------|-----------|-------------|--------------------------|-------------|-----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 7 | 22 | 42 | 71 | 30 | 116 | 116 | 262 | 94 | 23 | 3 | 120 | 5 | 119 | 2 | 126 | 579 |
| 07:15 | 4 | 29 | 45 | 78 | 50 | 110 | 103 | 263 | 103 | 38 | 6 | 147 | 4 | 155 | 7 | 166 | 654 |
| 07:30 | 5 | 33 | 38 | 76 | 42 | 111 | 114 | 267 | 145 | 52 | 9 | 206 | 3 | 167 | 1 | 171 | 720 |
| 07:45 | 10 | 32 | 41 | 83 | 56 | 202 | 155 | 413 | 125 | 47 | 6 | 178 | 4 | 169 | 6 | 179 | 853 |
| Total | 26 | 116 | 166 | 308 | 178 | 539 | 488 | 1205 | 467 | 160 | 24 | 651 | 16 | 610 | 16 | 642 | 2806 |
| 08:00 | 9 | 48 | 37 | 94 | 56 | 174 | 124 | 354 | 119 | 68 | 12 | 199 | 5 | 154 | 21 | 180 | 827 |
| 08:15 | 4 | 27 | 48 | 79 | 83 | 182 | 105 | 370 | 93 | 36 | 14 | 143 | 9 | 131 | 8 | 148 | 740 |
| 08:30 | 6 | 21 | 25 | 52 | 56 | 162 | 114 | 332 | 108 | 22 | 4 | 134 | 3 | 137 | 2 | 142 | 660 |
| 08:45 | 11 | 28 | 39 | 78 | 53 | 165 | 140 | 358 | 101 | 33 | 8 | 142 | 7 | 113 | 5 | 125 | 703 |
| Total | 30 | 124 | 149 | 303 | 248 | 683 | 483 | 1414 | 421 | 159 | 38 | 618 | 24 | 535 | 36 | 595 | 2930 |
| Grand Total | 56 | 240 | 315 | 611 | 426 | 1222 | 971 | 2619 | 888 | 319 | 62 | 1269 | 40 | 1145 | 52 | 1237 | 5736 |
| Apprch % | 9.2 | 39.3 | 51.6 | | 16.3 | 46.7 | 37.1 | | 70 | 25.1 | 4.9 | | 3.2 | 92.6 | 4.2 | | |
| Total % | 1 | 4.2 | 5.5 | 10.7 | 7.4 | 21.3 | 16.9 | 45.7 | 15.5 | 5.6 | 1.1 | 22.1 | 0.7 | 20 | 0.9 | 21.6 | |

| Start Time | MERCED ST Southbound | | | | MARINA BLVD Westbound | | | | MERCED ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|---------------------|-------------------------|-----------|-----------|------------|--------------------------|------------|------------|------------|-------------------------|-----------|-----------|------------|--------------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 5 | 33 | 38 | 76 | 42 | 111 | 114 | 267 | 145 | 52 | 9 | 206 | 3 | 167 | 1 | 171 | 720 |
| 07:45 | 10 | 32 | 41 | 83 | 56 | 202 | 155 | 413 | 125 | 47 | 6 | 178 | 4 | 169 | 6 | 179 | 853 |
| 08:00 | 9 | 48 | 37 | 94 | 56 | 174 | 124 | 354 | 119 | 68 | 12 | 199 | 5 | 154 | 21 | 180 | 827 |
| 08:15 | 4 | 27 | 48 | 79 | 83 | 182 | 105 | 370 | 93 | 36 | 14 | 143 | 9 | 131 | 8 | 148 | 740 |
| Total Volume | 28 | 140 | 164 | 332 | 237 | 669 | 498 | 1404 | 482 | 203 | 41 | 726 | 21 | 621 | 36 | 678 | 3140 |
| % App. Total | 8.4 | 42.2 | 49.4 | | 16.9 | 47.6 | 35.5 | | 66.4 | 28 | 5.6 | | 3.1 | 91.6 | 5.3 | | |
| PHF | .700 | .729 | .854 | .883 | .714 | .828 | .803 | .850 | .831 | .746 | .732 | .881 | .583 | .919 | .429 | .942 | .920 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-marina-p
Site Code : 10
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

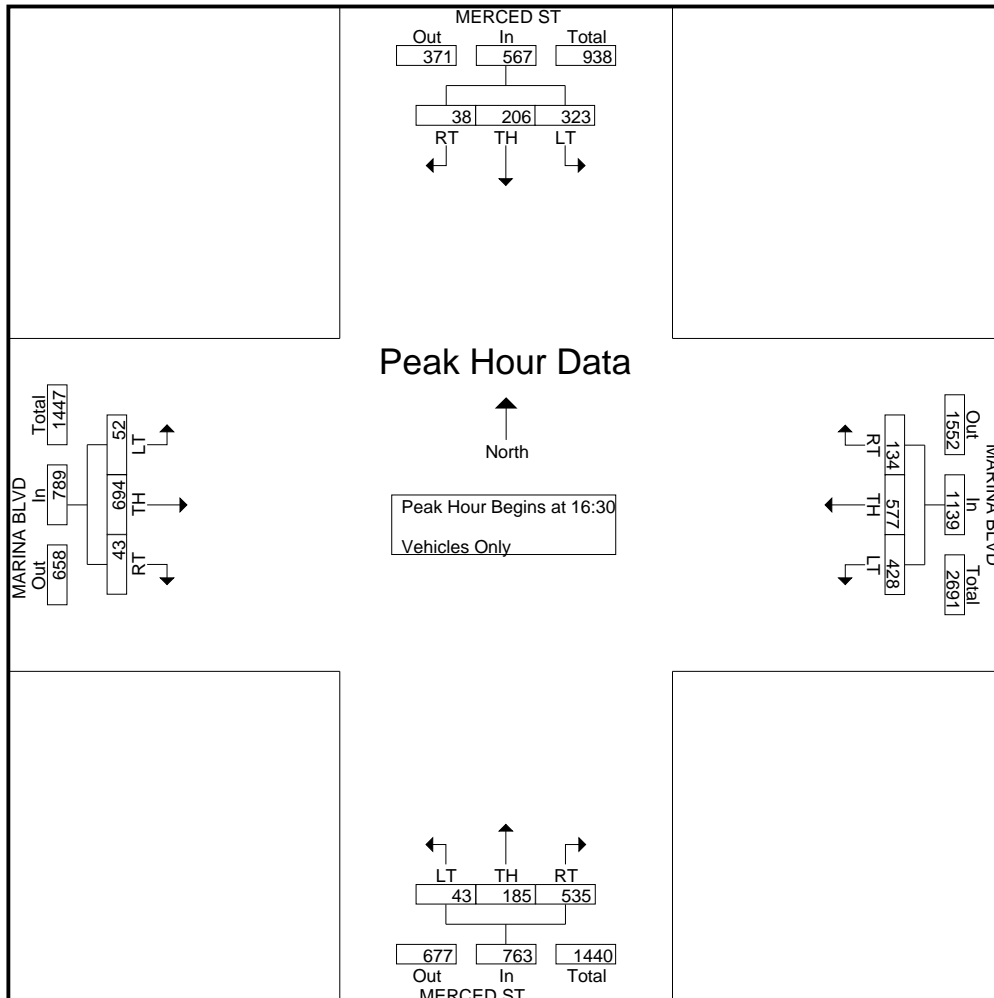
| Start Time | MERCED ST Southbound | | | | MARINA BLVD Westbound | | | | MERCED ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|----------------------|------------|------------|-------------|-----------------------|-------------|------------|-------------|----------------------|------------|-----------|-------------|-----------------------|-------------|-----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 8 | 64 | 86 | 158 | 40 | 120 | 102 | 262 | 159 | 62 | 11 | 232 | 15 | 167 | 6 | 188 | 840 |
| 16:15 | 7 | 41 | 66 | 114 | 43 | 137 | 106 | 286 | 139 | 36 | 9 | 184 | 12 | 143 | 12 | 167 | 751 |
| 16:30 | 7 | 56 | 84 | 147 | 38 | 145 | 98 | 281 | 134 | 57 | 14 | 205 | 6 | 168 | 11 | 185 | 818 |
| 16:45 | 12 | 39 | 63 | 114 | 39 | 142 | 97 | 278 | 114 | 32 | 8 | 154 | 17 | 166 | 8 | 191 | 737 |
| Total | 34 | 200 | 299 | 533 | 160 | 544 | 403 | 1107 | 546 | 187 | 42 | 775 | 50 | 644 | 37 | 731 | 3146 |
| 17:00 | 9 | 54 | 104 | 167 | 31 | 130 | 118 | 279 | 150 | 52 | 12 | 214 | 13 | 171 | 17 | 201 | 861 |
| 17:15 | 10 | 57 | 72 | 139 | 26 | 160 | 115 | 301 | 137 | 44 | 9 | 190 | 7 | 189 | 16 | 212 | 842 |
| 17:30 | 3 | 59 | 56 | 118 | 25 | 128 | 117 | 270 | 131 | 47 | 10 | 188 | 11 | 142 | 13 | 166 | 742 |
| 17:45 | 8 | 51 | 71 | 130 | 24 | 151 | 98 | 273 | 105 | 31 | 11 | 147 | 11 | 171 | 8 | 190 | 740 |
| Total | 30 | 221 | 303 | 554 | 106 | 569 | 448 | 1123 | 523 | 174 | 42 | 739 | 42 | 673 | 54 | 769 | 3185 |
| Grand Total | 64 | 421 | 602 | 1087 | 266 | 1113 | 851 | 2230 | 1069 | 361 | 84 | 1514 | 92 | 1317 | 91 | 1500 | 6331 |
| Apprch % | 5.9 | 38.7 | 55.4 | | 11.9 | 49.9 | 38.2 | | 70.6 | 23.8 | 5.5 | | 6.1 | 87.8 | 6.1 | | |
| Total % | 1 | 6.6 | 9.5 | 17.2 | 4.2 | 17.6 | 13.4 | 35.2 | 16.9 | 5.7 | 1.3 | 23.9 | 1.5 | 20.8 | 1.4 | 23.7 | |

| Start Time | MERCED ST Southbound | | | | MARINA BLVD Westbound | | | | MERCED ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|------------|----------------------|----|----|------------|-----------------------|----|----|------------|----------------------|----|----|------------|-----------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:30

| | | | | | | | | | | | | | | | | | |
|--------------|-----------|-----------|------------|------------|-----------|------------|------------|------------|------------|-----------|-----------|------------|-----------|------------|-----------|------------|------------|
| 16:30 | 7 | 56 | 84 | 147 | 38 | 145 | 98 | 281 | 134 | 57 | 14 | 205 | 6 | 168 | 11 | 185 | 818 |
| 16:45 | 12 | 39 | 63 | 114 | 39 | 142 | 97 | 278 | 114 | 32 | 8 | 154 | 17 | 166 | 8 | 191 | 737 |
| 17:00 | 9 | 54 | 104 | 167 | 31 | 130 | 118 | 279 | 150 | 52 | 12 | 214 | 13 | 171 | 17 | 201 | 861 |
| 17:15 | 10 | 57 | 72 | 139 | 26 | 160 | 115 | 301 | 137 | 44 | 9 | 190 | 7 | 189 | 16 | 212 | 842 |
| Total Volume | 38 | 206 | 323 | 567 | 134 | 577 | 428 | 1139 | 535 | 185 | 43 | 763 | 43 | 694 | 52 | 789 | 3258 |
| % App. Total | 6.7 | 36.3 | 57 | | 11.8 | 50.7 | 37.6 | | 70.1 | 24.2 | 5.6 | | 5.4 | 88 | 6.6 | | |
| PHF | .792 | .904 | .776 | .849 | .859 | .902 | .907 | .946 | .892 | .811 | .768 | .891 | .632 | .918 | .765 | .930 | .946 |



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-marina-s
Site Code : 10
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MERCED ST Southbound | | | | MARINA BLVD Westbound | | | | MERCED ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|-------------|----------------------|------|-----|------------|-----------------------|------|------|------------|----------------------|------|-----|------------|-----------------------|------|-----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 0 | 35 | 23 | 58 | 20 | 91 | 88 | 199 | 82 | 53 | 4 | 139 | 7 | 109 | 6 | 122 | 518 |
| 10:15 | 0 | 33 | 32 | 65 | 40 | 82 | 95 | 217 | 95 | 26 | 8 | 129 | 9 | 113 | 4 | 126 | 537 |
| 10:30 | 3 | 26 | 46 | 75 | 32 | 104 | 91 | 227 | 95 | 36 | 6 | 137 | 4 | 155 | 8 | 167 | 606 |
| 10:45 | 2 | 43 | 34 | 79 | 35 | 118 | 103 | 256 | 101 | 41 | 10 | 152 | 6 | 133 | 9 | 148 | 635 |
| Total | 5 | 137 | 135 | 277 | 127 | 395 | 377 | 899 | 373 | 156 | 28 | 557 | 26 | 510 | 27 | 563 | 2296 |
| 11:00 | 4 | 35 | 41 | 80 | 32 | 113 | 105 | 250 | 100 | 36 | 18 | 154 | 3 | 137 | 10 | 150 | 634 |
| 11:15 | 2 | 35 | 39 | 76 | 22 | 119 | 126 | 267 | 100 | 38 | 11 | 149 | 5 | 123 | 7 | 135 | 627 |
| 11:30 | 7 | 36 | 30 | 73 | 20 | 110 | 95 | 225 | 112 | 44 | 7 | 163 | 11 | 123 | 12 | 146 | 607 |
| 11:45 | 4 | 36 | 35 | 75 | 37 | 104 | 145 | 286 | 107 | 44 | 23 | 174 | 12 | 137 | 12 | 161 | 696 |
| Total | 17 | 142 | 145 | 304 | 111 | 446 | 471 | 1028 | 419 | 162 | 59 | 640 | 31 | 520 | 41 | 592 | 2564 |
| 12:00 | 6 | 37 | 54 | 97 | 32 | 114 | 94 | 240 | 104 | 36 | 23 | 163 | 5 | 152 | 7 | 164 | 664 |
| 12:15 | 4 | 50 | 36 | 90 | 26 | 146 | 111 | 283 | 108 | 43 | 4 | 155 | 7 | 129 | 11 | 147 | 675 |
| 12:30 | 8 | 45 | 43 | 96 | 34 | 129 | 82 | 245 | 104 | 40 | 17 | 161 | 6 | 148 | 8 | 162 | 664 |
| 12:45 | 7 | 36 | 49 | 92 | 29 | 121 | 105 | 255 | 113 | 50 | 19 | 182 | 6 | 140 | 7 | 153 | 682 |
| Total | 25 | 168 | 182 | 375 | 121 | 510 | 392 | 1023 | 429 | 169 | 63 | 661 | 24 | 569 | 33 | 626 | 2685 |
| 13:00 | 7 | 38 | 31 | 76 | 35 | 130 | 111 | 276 | 116 | 45 | 13 | 174 | 11 | 125 | 11 | 147 | 673 |
| 13:15 | 3 | 40 | 48 | 91 | 19 | 143 | 121 | 283 | 102 | 46 | 8 | 156 | 11 | 160 | 9 | 180 | 710 |
| 13:30 | 7 | 33 | 39 | 79 | 24 | 153 | 94 | 271 | 107 | 44 | 10 | 161 | 12 | 147 | 14 | 173 | 684 |
| 13:45 | 8 | 43 | 42 | 93 | 42 | 128 | 88 | 258 | 86 | 40 | 5 | 131 | 2 | 142 | 12 | 156 | 638 |
| Total | 25 | 154 | 160 | 339 | 120 | 554 | 414 | 1088 | 411 | 175 | 36 | 622 | 36 | 574 | 46 | 656 | 2705 |
| Grand Total | 72 | 601 | 622 | 1295 | 479 | 1905 | 1654 | 4038 | 1632 | 662 | 186 | 2480 | 117 | 2173 | 147 | 2437 | 10250 |
| Apprch % | 5.6 | 46.4 | 48 | | 11.9 | 47.2 | 41 | | 65.8 | 26.7 | 7.5 | | 4.8 | 89.2 | 6 | | |
| Total % | 0.7 | 5.9 | 6.1 | 12.6 | 4.7 | 18.6 | 16.1 | 39.4 | 15.9 | 6.5 | 1.8 | 24.2 | 1.1 | 21.2 | 1.4 | 23.8 | |

| Start Time | MERCED ST Southbound | | | | MARINA BLVD Westbound | | | | MERCED ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------|----------------------|-----------|-----------|------------|-----------------------|------------|------------|------------|----------------------|-----------|-----------|------------|-----------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 12:45 | 7 | 36 | 49 | 92 | 29 | 121 | 105 | 255 | 113 | 50 | 19 | 182 | 6 | 140 | 7 | 153 | 682 |
| 13:00 | 7 | 38 | 31 | 76 | 35 | 130 | 111 | 276 | 116 | 45 | 13 | 174 | 11 | 125 | 11 | 147 | 673 |
| 13:15 | 3 | 40 | 48 | 91 | 19 | 143 | 121 | 283 | 102 | 46 | 8 | 156 | 11 | 160 | 9 | 180 | 710 |
| 13:30 | 7 | 33 | 39 | 79 | 24 | 153 | 94 | 271 | 107 | 44 | 10 | 161 | 12 | 147 | 14 | 173 | 684 |
| Total Volume | 24 | 147 | 167 | 338 | 107 | 547 | 431 | 1085 | 438 | 185 | 50 | 673 | 40 | 572 | 41 | 653 | 2749 |
| % App. Total | 7.1 | 43.5 | 49.4 | | 9.9 | 50.4 | 39.7 | | 65.1 | 27.5 | 7.4 | | 6.1 | 87.6 | 6.3 | | |
| PHF | .857 | .919 | .852 | .918 | .764 | .894 | .890 | .958 | .944 | .925 | .658 | .924 | .833 | .894 | .732 | .907 | .968 |

Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1

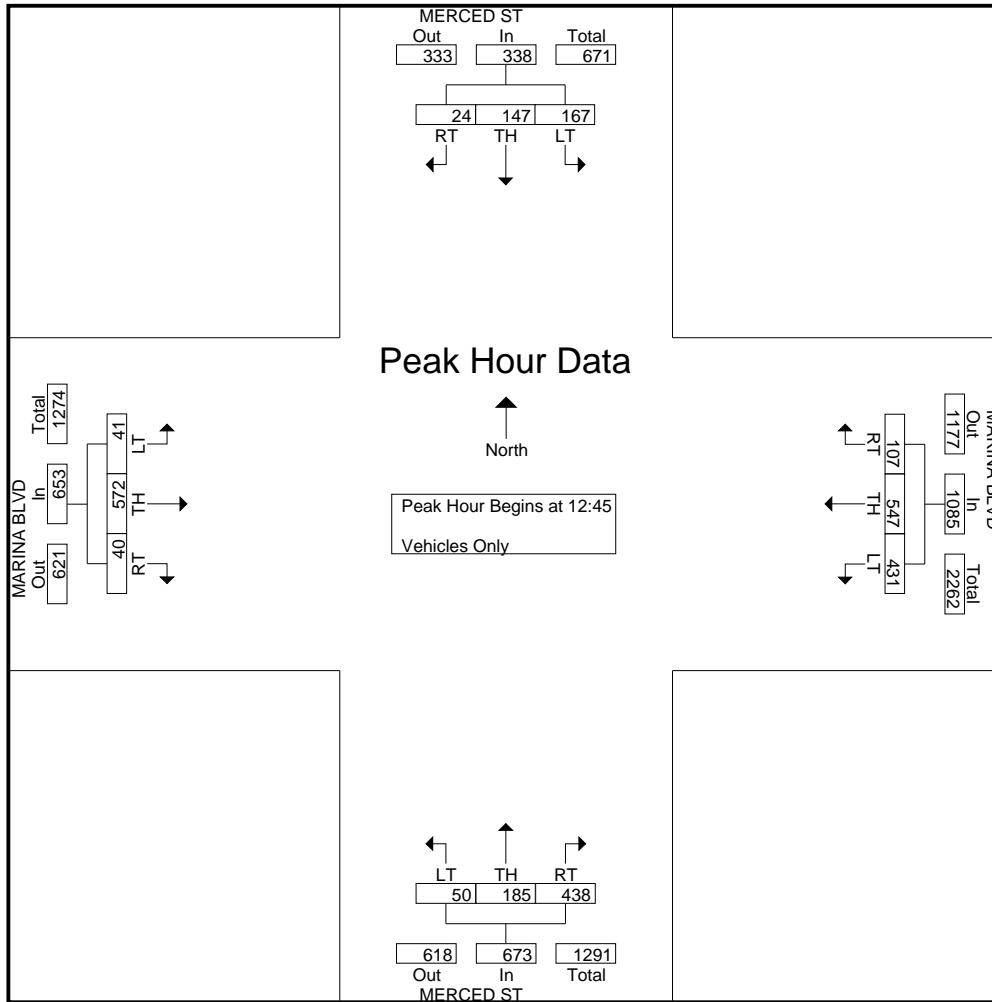
Peak Hour for Entire Intersection Begins at 12:45

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-marina-s
Site Code : 10
Start Date : 2/2/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

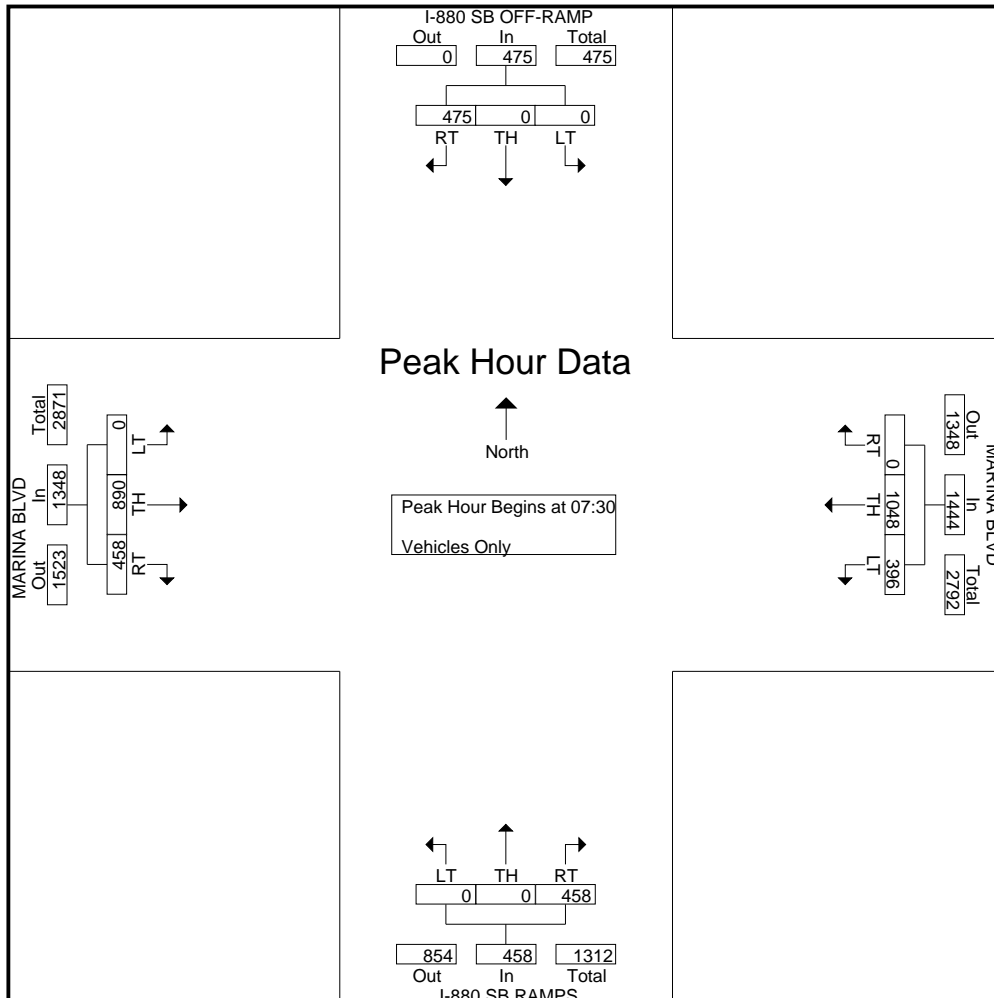
File Name : 880sb-marina-a
Site Code : 20
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 SB OFF-RAMP Southbound | | | | MARINA BLVD Westbound | | | | I-880 SB RAMPS Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|---------------------------------|----------|----------|------------|--------------------------|-------------|------------|-------------|------------------------------|----------|----------|------------|--------------------------|-------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 130 | 0 | 0 | 130 | 0 | 153 | 77 | 230 | 81 | 0 | 0 | 81 | 113 | 154 | 0 | 267 | 708 |
| 07:15 | 92 | 0 | 0 | 92 | 0 | 203 | 78 | 281 | 84 | 0 | 0 | 84 | 127 | 163 | 0 | 290 | 747 |
| 07:30 | 118 | 0 | 0 | 118 | 0 | 211 | 79 | 290 | 102 | 0 | 0 | 102 | 145 | 235 | 0 | 380 | 890 |
| 07:45 | 145 | 0 | 0 | 145 | 0 | 275 | 86 | 361 | 135 | 0 | 0 | 135 | 85 | 208 | 0 | 293 | 934 |
| Total | 485 | 0 | 0 | 485 | 0 | 842 | 320 | 1162 | 402 | 0 | 0 | 402 | 470 | 760 | 0 | 1230 | 3279 |
| 08:00 | 111 | 0 | 0 | 111 | 0 | 283 | 113 | 396 | 127 | 0 | 0 | 127 | 123 | 228 | 0 | 351 | 985 |
| 08:15 | 101 | 0 | 0 | 101 | 0 | 279 | 118 | 397 | 94 | 0 | 0 | 94 | 105 | 219 | 0 | 324 | 916 |
| 08:30 | 103 | 0 | 0 | 103 | 0 | 218 | 74 | 292 | 93 | 0 | 0 | 93 | 125 | 145 | 0 | 270 | 758 |
| 08:45 | 133 | 0 | 0 | 133 | 0 | 229 | 75 | 304 | 120 | 0 | 0 | 120 | 117 | 140 | 0 | 257 | 814 |
| Total | 448 | 0 | 0 | 448 | 0 | 1009 | 380 | 1389 | 434 | 0 | 0 | 434 | 470 | 732 | 0 | 1202 | 3473 |
| Grand Total | 933 | 0 | 0 | 933 | 0 | 1851 | 700 | 2551 | 836 | 0 | 0 | 836 | 940 | 1492 | 0 | 2432 | 6752 |
| Apprch % | 100 | 0 | 0 | | 0 | 72.6 | 27.4 | | 100 | 0 | 0 | | 38.7 | 61.3 | 0 | | |
| Total % | 13.8 | 0 | 0 | 13.8 | 0 | 27.4 | 10.4 | 37.8 | 12.4 | 0 | 0 | 12.4 | 13.9 | 22.1 | 0 | 36 | |

| Start Time | I-880 SB OFF-RAMP Southbound | | | | MARINA BLVD Westbound | | | | I-880 SB RAMPS Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|---------------------|---------------------------------|----------|----------|------------|--------------------------|-------------|------------|-------------|------------------------------|----------|----------|------------|--------------------------|------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 118 | 0 | 0 | 118 | 0 | 211 | 79 | 290 | 102 | 0 | 0 | 102 | 145 | 235 | 0 | 380 | 890 |
| 07:45 | 145 | 0 | 0 | 145 | 0 | 275 | 86 | 361 | 135 | 0 | 0 | 135 | 85 | 208 | 0 | 293 | 934 |
| 08:00 | 111 | 0 | 0 | 111 | 0 | 283 | 113 | 396 | 127 | 0 | 0 | 127 | 123 | 228 | 0 | 351 | 985 |
| 08:15 | 101 | 0 | 0 | 101 | 0 | 279 | 118 | 397 | 94 | 0 | 0 | 94 | 105 | 219 | 0 | 324 | 916 |
| Total Volume | 475 | 0 | 0 | 475 | 0 | 1048 | 396 | 1444 | 458 | 0 | 0 | 458 | 458 | 890 | 0 | 1348 | 3725 |
| % App. Total | 100 | 0 | 0 | | 0 | 72.6 | 27.4 | | 100 | 0 | 0 | | 34 | 66 | 0 | | |
| PHF | .819 | .000 | .000 | .819 | .000 | .926 | .839 | .909 | .848 | .000 | .000 | .848 | .790 | .947 | .000 | .887 | .945 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

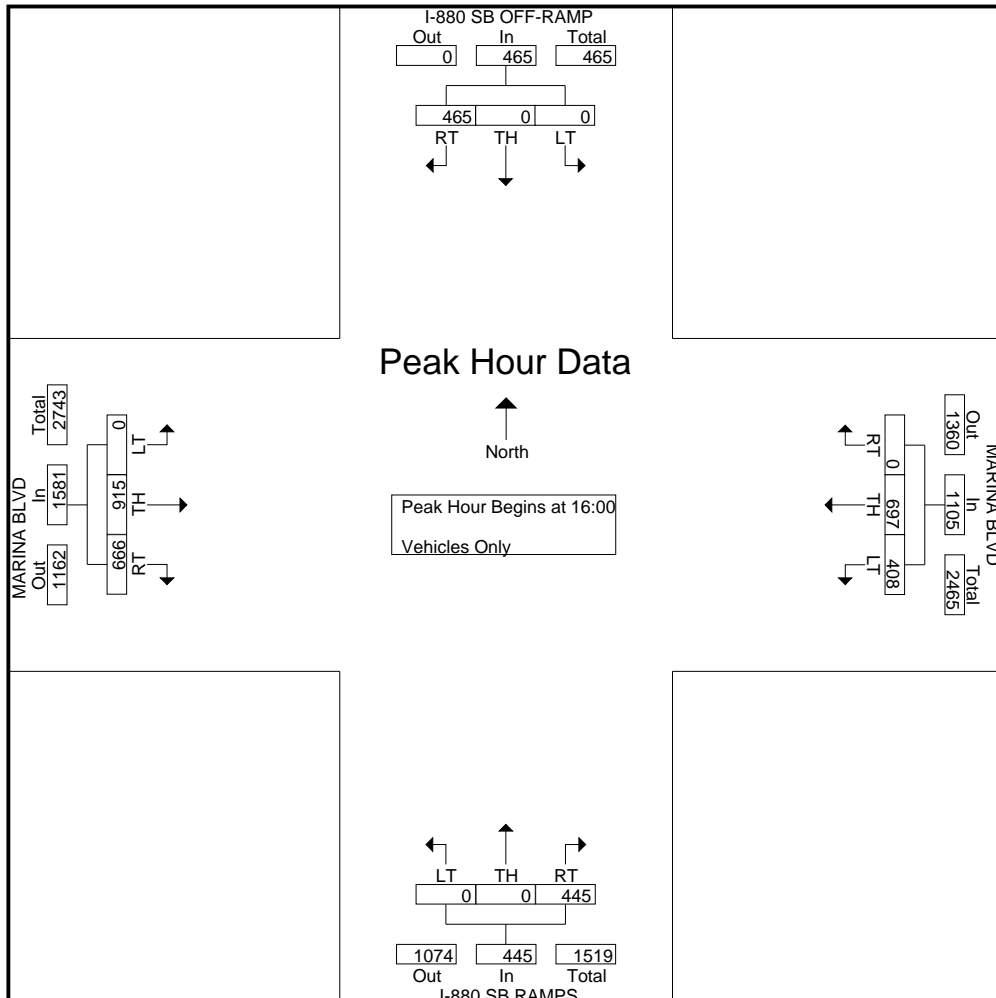
CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880sb-marina-p
Site Code : 20
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 SB OFF-RAMP Southbound | | | | MARINA BLVD Westbound | | | | I-880 SB RAMPS Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|---------------------------------|----------|----------|------------|--------------------------|-------------|------------|-------------|------------------------------|----------|----------|------------|--------------------------|-------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 131 | 0 | 0 | 131 | 0 | 155 | 123 | 278 | 93 | 0 | 0 | 93 | 182 | 279 | 0 | 461 | 963 |
| 16:15 | 121 | 0 | 0 | 121 | 0 | 176 | 86 | 262 | 109 | 0 | 0 | 109 | 162 | 211 | 0 | 373 | 865 |
| 16:30 | 116 | 0 | 0 | 116 | 0 | 176 | 101 | 277 | 135 | 0 | 0 | 135 | 177 | 220 | 0 | 397 | 925 |
| 16:45 | 97 | 0 | 0 | 97 | 0 | 190 | 98 | 288 | 108 | 0 | 0 | 108 | 145 | 205 | 0 | 350 | 843 |
| Total | 465 | 0 | 0 | 465 | 0 | 697 | 408 | 1105 | 445 | 0 | 0 | 445 | 666 | 915 | 0 | 1581 | 3596 |
| 17:00 | 117 | 0 | 0 | 117 | 0 | 184 | 93 | 277 | 86 | 0 | 0 | 86 | 207 | 241 | 0 | 448 | 928 |
| 17:15 | 91 | 0 | 0 | 91 | 0 | 194 | 92 | 286 | 118 | 0 | 0 | 118 | 193 | 208 | 0 | 401 | 896 |
| 17:30 | 115 | 0 | 0 | 115 | 0 | 183 | 88 | 271 | 117 | 0 | 0 | 117 | 150 | 193 | 0 | 343 | 846 |
| 17:45 | 108 | 0 | 0 | 108 | 0 | 175 | 95 | 270 | 90 | 0 | 0 | 90 | 159 | 174 | 0 | 333 | 801 |
| Total | 431 | 0 | 0 | 431 | 0 | 736 | 368 | 1104 | 411 | 0 | 0 | 411 | 709 | 816 | 0 | 1525 | 3471 |
| Grand Total | 896 | 0 | 0 | 896 | 0 | 1433 | 776 | 2209 | 856 | 0 | 0 | 856 | 1375 | 1731 | 0 | 3106 | 7067 |
| Apprch % | 100 | 0 | 0 | | 0 | 64.9 | 35.1 | | 100 | 0 | 0 | | 44.3 | 55.7 | 0 | | |
| Total % | 12.7 | 0 | 0 | 12.7 | 0 | 20.3 | 11 | 31.3 | 12.1 | 0 | 0 | 12.1 | 19.5 | 24.5 | 0 | 44 | |

| Start Time | I-880 SB OFF-RAMP Southbound | | | | MARINA BLVD Westbound | | | | I-880 SB RAMPS Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--|---------------------------------|----------|----------|------------|--------------------------|------------|------------|-------------|------------------------------|----------|----------|------------|--------------------------|------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 16:00 | | | | | | | | | | | | | | | | | |
| 16:00 | 131 | 0 | 0 | 131 | 0 | 155 | 123 | 278 | 93 | 0 | 0 | 93 | 182 | 279 | 0 | 461 | 963 |
| 16:15 | 121 | 0 | 0 | 121 | 0 | 176 | 86 | 262 | 109 | 0 | 0 | 109 | 162 | 211 | 0 | 373 | 865 |
| 16:30 | 116 | 0 | 0 | 116 | 0 | 176 | 101 | 277 | 135 | 0 | 0 | 135 | 177 | 220 | 0 | 397 | 925 |
| 16:45 | 97 | 0 | 0 | 97 | 0 | 190 | 98 | 288 | 108 | 0 | 0 | 108 | 145 | 205 | 0 | 350 | 843 |
| Total Volume | 465 | 0 | 0 | 465 | 0 | 697 | 408 | 1105 | 445 | 0 | 0 | 445 | 666 | 915 | 0 | 1581 | 3596 |
| % App. Total | 100 | 0 | 0 | | 0 | 63.1 | 36.9 | | 100 | 0 | 0 | | 42.1 | 57.9 | 0 | | |
| PHF | .887 | .000 | .000 | .887 | .000 | .917 | .829 | .959 | .824 | .000 | .000 | .824 | .915 | .820 | .000 | .857 | .934 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880sb-marina-s
Site Code : 20
Start Date : 1/26/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 SB OFF-RAMP Southbound | | | | MARINA BLVD Westbound | | | | I-880 SB RAMPS Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|---------------------------------|----------|----------|-------------|--------------------------|-------------|-------------|-------------|------------------------------|----------|----------|-------------|--------------------------|-------------|----------|-------------|--------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 95 | 0 | 0 | 95 | 0 | 127 | 67 | 194 | 70 | 0 | 0 | 70 | 90 | 137 | 0 | 227 | 586 |
| 10:15 | 74 | 0 | 0 | 74 | 0 | 161 | 69 | 230 | 88 | 0 | 0 | 88 | 93 | 162 | 0 | 255 | 647 |
| 10:30 | 99 | 0 | 0 | 99 | 0 | 117 | 84 | 201 | 103 | 0 | 0 | 103 | 87 | 173 | 0 | 260 | 663 |
| 10:45 | 85 | 0 | 0 | 85 | 0 | 164 | 80 | 244 | 94 | 0 | 0 | 94 | 122 | 143 | 0 | 265 | 688 |
| Total | 353 | 0 | 0 | 353 | 0 | 569 | 300 | 869 | 355 | 0 | 0 | 355 | 392 | 615 | 0 | 1007 | 2584 |
| 11:00 | 99 | 0 | 0 | 99 | 0 | 161 | 98 | 259 | 94 | 0 | 0 | 94 | 92 | 187 | 0 | 279 | 731 |
| 11:15 | 83 | 0 | 0 | 83 | 0 | 157 | 122 | 279 | 90 | 0 | 0 | 90 | 98 | 176 | 0 | 274 | 726 |
| 11:30 | 84 | 0 | 0 | 84 | 0 | 172 | 107 | 279 | 107 | 0 | 0 | 107 | 89 | 163 | 0 | 252 | 722 |
| 11:45 | 107 | 0 | 0 | 107 | 0 | 165 | 110 | 275 | 100 | 0 | 0 | 100 | 142 | 185 | 0 | 327 | 809 |
| Total | 373 | 0 | 0 | 373 | 0 | 655 | 437 | 1092 | 391 | 0 | 0 | 391 | 421 | 711 | 0 | 1132 | 2988 |
| 12:00 | 95 | 0 | 0 | 95 | 0 | 170 | 116 | 286 | 102 | 0 | 0 | 102 | 134 | 167 | 0 | 301 | 784 |
| 12:15 | 117 | 0 | 0 | 117 | 0 | 176 | 119 | 295 | 88 | 0 | 0 | 88 | 133 | 183 | 0 | 316 | 816 |
| 12:30 | 100 | 0 | 0 | 100 | 0 | 172 | 148 | 320 | 100 | 0 | 0 | 100 | 97 | 189 | 0 | 286 | 806 |
| 12:45 | 120 | 0 | 0 | 120 | 0 | 161 | 126 | 287 | 114 | 0 | 0 | 114 | 98 | 180 | 0 | 278 | 799 |
| Total | 432 | 0 | 0 | 432 | 0 | 679 | 509 | 1188 | 404 | 0 | 0 | 404 | 462 | 719 | 0 | 1181 | 3205 |
| 13:00 | 136 | 0 | 0 | 136 | 0 | 187 | 125 | 312 | 105 | 0 | 0 | 105 | 100 | 198 | 0 | 298 | 851 |
| 13:15 | 119 | 0 | 0 | 119 | 0 | 183 | 128 | 311 | 126 | 0 | 0 | 126 | 115 | 188 | 0 | 303 | 859 |
| 13:30 | 133 | 0 | 0 | 133 | 0 | 173 | 124 | 297 | 86 | 0 | 0 | 86 | 126 | 205 | 0 | 331 | 847 |
| 13:45 | 115 | 0 | 0 | 115 | 0 | 195 | 99 | 294 | 114 | 0 | 0 | 114 | 137 | 188 | 0 | 325 | 848 |
| Total | 503 | 0 | 0 | 503 | 0 | 738 | 476 | 1214 | 431 | 0 | 0 | 431 | 478 | 779 | 0 | 1257 | 3405 |
| Grand Total | 1661 | 0 | 0 | 1661 | 0 | 2641 | 1722 | 4363 | 1581 | 0 | 0 | 1581 | 1753 | 2824 | 0 | 4577 | 12182 |
| Apprch % | 100 | 0 | 0 | | 0 | 60.5 | 39.5 | | 100 | 0 | 0 | | 38.3 | 61.7 | 0 | | |
| Total % | 13.6 | 0 | 0 | 13.6 | 0 | 21.7 | 14.1 | 35.8 | 13 | 0 | 0 | 13 | 14.4 | 23.2 | 0 | 37.6 | |

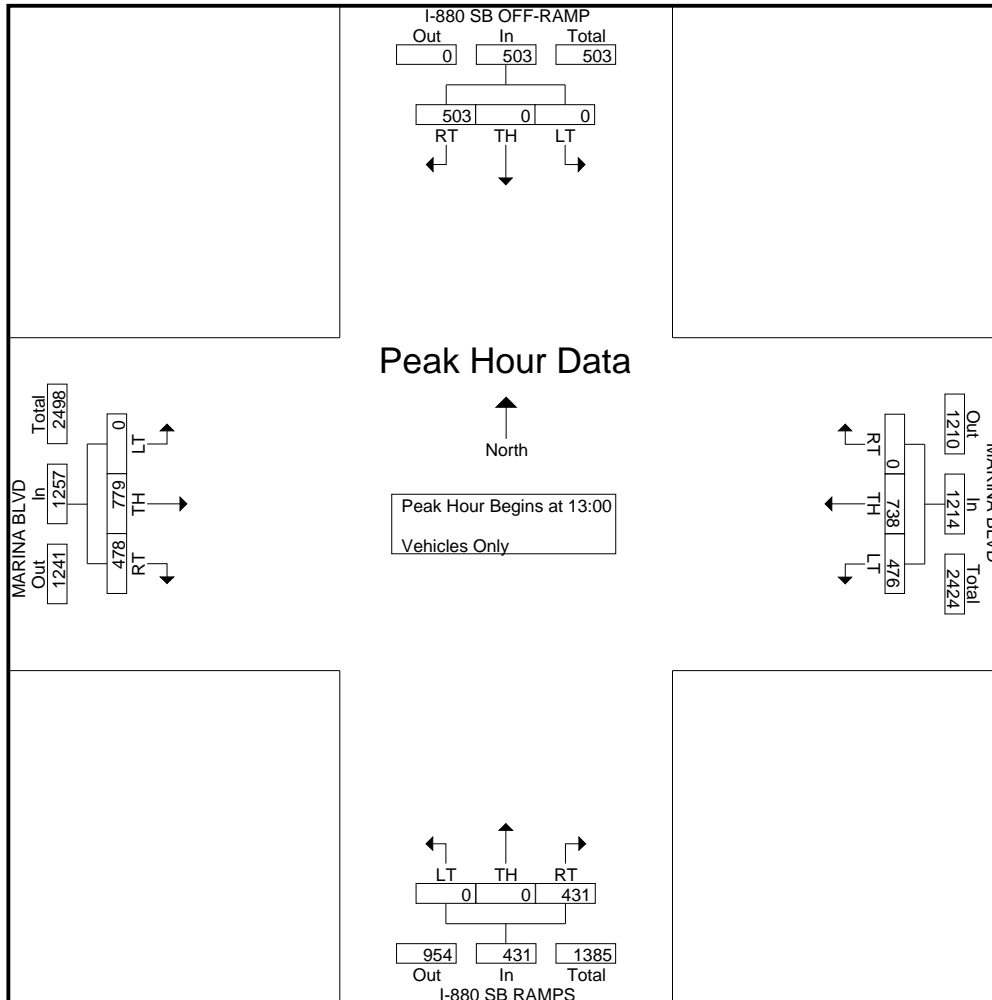
| Start Time | I-880 SB OFF-RAMP Southbound | | | | MARINA BLVD Westbound | | | | I-880 SB RAMPS Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--|---------------------------------|----------|----------|------------|--------------------------|------------|------------|-------------|------------------------------|----------|----------|------------|--------------------------|------------|----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 13:00 | | | | | | | | | | | | | | | | | |
| 13:00 | 136 | 0 | 0 | 136 | 0 | 187 | 125 | 312 | 105 | 0 | 0 | 105 | 100 | 198 | 0 | 298 | 851 |
| 13:15 | 119 | 0 | 0 | 119 | 0 | 183 | 128 | 311 | 126 | 0 | 0 | 126 | 115 | 188 | 0 | 303 | 859 |
| 13:30 | 133 | 0 | 0 | 133 | 0 | 173 | 124 | 297 | 86 | 0 | 0 | 86 | 126 | 205 | 0 | 331 | 847 |
| 13:45 | 115 | 0 | 0 | 115 | 0 | 195 | 99 | 294 | 114 | 0 | 0 | 114 | 137 | 188 | 0 | 325 | 848 |
| Total Volume | 503 | 0 | 0 | 503 | 0 | 738 | 476 | 1214 | 431 | 0 | 0 | 431 | 478 | 779 | 0 | 1257 | 3405 |
| % App. Total | 100 | 0 | 0 | | 0 | 60.8 | 39.2 | | 100 | 0 | 0 | | 38 | 62 | 0 | | |
| PHF | .925 | .000 | .000 | .925 | .000 | .946 | .930 | .973 | .855 | .000 | .000 | .855 | .872 | .950 | .000 | .949 | .991 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880sb-marina-s
Site Code : 20
Start Date : 1/26/2013
Page No : 2



MARKS TRAFFIC DATA

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916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

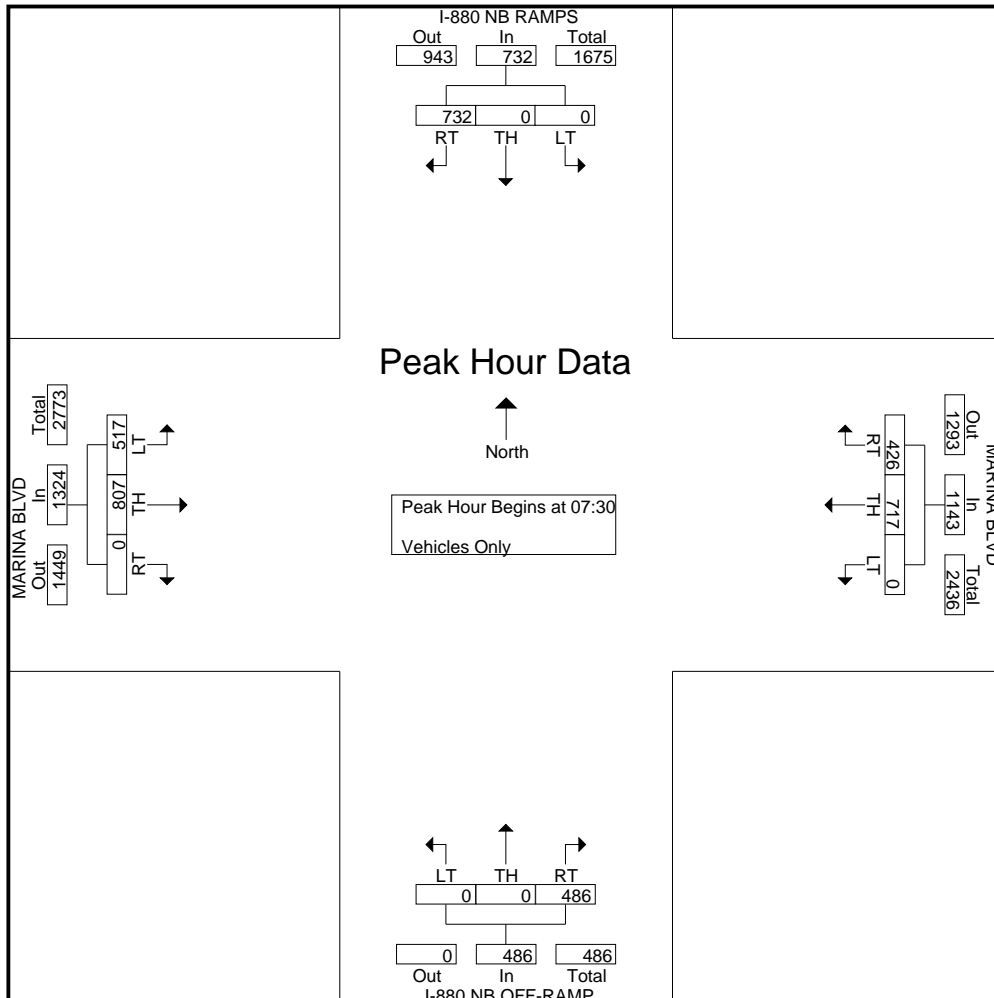
File Name : 880nb-marina-a
Site Code : 21
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 NB RAMPS Southbound | | | | MARINA BLVD Westbound | | | | I-880 NB OFF-RAMP Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|------------------------------|----------|----------|-------------|--------------------------|-------------|----------|-------------|---------------------------------|----------|----------|------------|--------------------------|-------------|------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 127 | 0 | 0 | 127 | 85 | 99 | 0 | 184 | 105 | 0 | 0 | 105 | 0 | 114 | 124 | 238 | 654 |
| 07:15 | 158 | 0 | 0 | 158 | 77 | 121 | 0 | 198 | 124 | 0 | 0 | 124 | 0 | 125 | 131 | 256 | 736 |
| 07:30 | 152 | 0 | 0 | 152 | 118 | 138 | 0 | 256 | 106 | 0 | 0 | 106 | 0 | 174 | 156 | 330 | 844 |
| 07:45 | 205 | 0 | 0 | 205 | 95 | 170 | 0 | 265 | 124 | 0 | 0 | 124 | 0 | 219 | 121 | 340 | 934 |
| Total | 642 | 0 | 0 | 642 | 375 | 528 | 0 | 903 | 459 | 0 | 0 | 459 | 0 | 632 | 532 | 1164 | 3168 |
| 08:00 | 193 | 0 | 0 | 193 | 120 | 196 | 0 | 316 | 118 | 0 | 0 | 118 | 0 | 220 | 131 | 351 | 978 |
| 08:15 | 182 | 0 | 0 | 182 | 93 | 213 | 0 | 306 | 138 | 0 | 0 | 138 | 0 | 194 | 109 | 303 | 929 |
| 08:30 | 138 | 0 | 0 | 138 | 81 | 145 | 0 | 226 | 124 | 0 | 0 | 124 | 0 | 168 | 76 | 244 | 732 |
| 08:45 | 135 | 0 | 0 | 135 | 62 | 142 | 0 | 204 | 121 | 0 | 0 | 121 | 0 | 149 | 93 | 242 | 702 |
| Total | 648 | 0 | 0 | 648 | 356 | 696 | 0 | 1052 | 501 | 0 | 0 | 501 | 0 | 731 | 409 | 1140 | 3341 |
| Grand Total | 1290 | 0 | 0 | 1290 | 731 | 1224 | 0 | 1955 | 960 | 0 | 0 | 960 | 0 | 1363 | 941 | 2304 | 6509 |
| Apprch % | 100 | 0 | 0 | | 37.4 | 62.6 | 0 | | 100 | 0 | 0 | | 0 | 59.2 | 40.8 | | |
| Total % | 19.8 | 0 | 0 | 19.8 | 11.2 | 18.8 | 0 | 30 | 14.7 | 0 | 0 | 14.7 | 0 | 20.9 | 14.5 | 35.4 | |

| Start Time | I-880 NB RAMPS Southbound | | | | MARINA BLVD Westbound | | | | I-880 NB OFF-RAMP Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|---------------------|------------------------------|----------|----------|------------|--------------------------|------------|----------|-------------|---------------------------------|----------|----------|------------|--------------------------|------------|------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 152 | 0 | 0 | 152 | 118 | 138 | 0 | 256 | 106 | 0 | 0 | 106 | 0 | 174 | 156 | 330 | 844 |
| 07:45 | 205 | 0 | 0 | 205 | 95 | 170 | 0 | 265 | 124 | 0 | 0 | 124 | 0 | 219 | 121 | 340 | 934 |
| 08:00 | 193 | 0 | 0 | 193 | 120 | 196 | 0 | 316 | 118 | 0 | 0 | 118 | 0 | 220 | 131 | 351 | 978 |
| 08:15 | 182 | 0 | 0 | 182 | 93 | 213 | 0 | 306 | 138 | 0 | 0 | 138 | 0 | 194 | 109 | 303 | 929 |
| Total Volume | 732 | 0 | 0 | 732 | 426 | 717 | 0 | 1143 | 486 | 0 | 0 | 486 | 0 | 807 | 517 | 1324 | 3685 |
| % App. Total | 100 | 0 | 0 | | 37.3 | 62.7 | 0 | | 100 | 0 | 0 | | 0 | 61 | 39 | | |
| PHF | .893 | .000 | .000 | .893 | .888 | .842 | .000 | .904 | .880 | .000 | .000 | .880 | .000 | .917 | .829 | .943 | .942 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

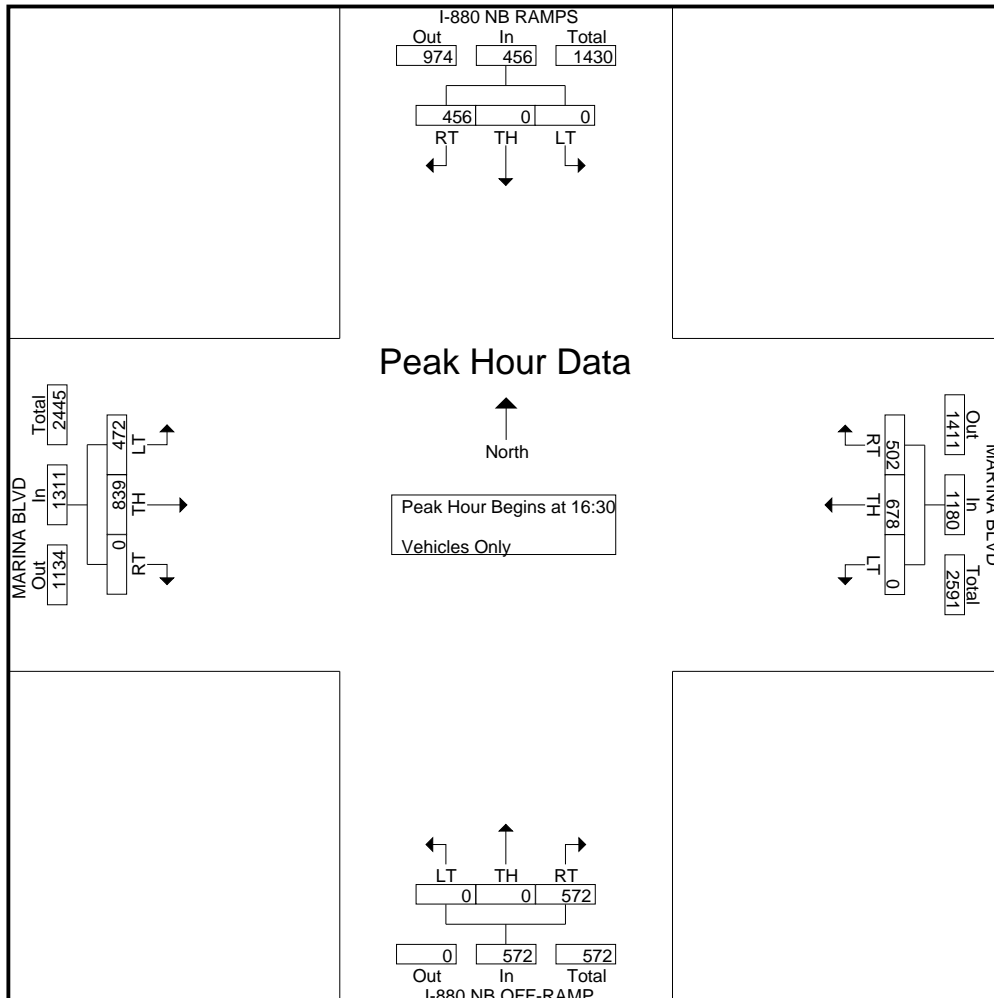
CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880nb-marina-p
Site Code : 21
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 NB RAMPS Southbound | | | | MARINA BLVD Westbound | | | | I-880 NB OFF-RAMP Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|------------------------------|----------|----------|------------|--------------------------|-------------|----------|-------------|---------------------------------|----------|----------|-------------|--------------------------|-------------|------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 95 | 0 | 0 | 95 | 134 | 177 | 0 | 311 | 122 | 0 | 0 | 122 | 0 | 209 | 154 | 363 | 891 |
| 16:15 | 100 | 0 | 0 | 100 | 108 | 168 | 0 | 276 | 146 | 0 | 0 | 146 | 0 | 196 | 122 | 318 | 840 |
| 16:30 | 101 | 0 | 0 | 101 | 135 | 181 | 0 | 316 | 141 | 0 | 0 | 141 | 0 | 212 | 136 | 348 | 906 |
| 16:45 | 118 | 0 | 0 | 118 | 117 | 174 | 0 | 291 | 143 | 0 | 0 | 143 | 0 | 199 | 108 | 307 | 859 |
| Total | 414 | 0 | 0 | 414 | 494 | 700 | 0 | 1194 | 552 | 0 | 0 | 552 | 0 | 816 | 520 | 1336 | 3496 |
| 17:00 | 112 | 0 | 0 | 112 | 132 | 166 | 0 | 298 | 121 | 0 | 0 | 121 | 0 | 206 | 126 | 332 | 863 |
| 17:15 | 125 | 0 | 0 | 125 | 118 | 157 | 0 | 275 | 167 | 0 | 0 | 167 | 0 | 222 | 102 | 324 | 891 |
| 17:30 | 105 | 0 | 0 | 105 | 110 | 168 | 0 | 278 | 119 | 0 | 0 | 119 | 0 | 202 | 106 | 308 | 810 |
| 17:45 | 114 | 0 | 0 | 114 | 88 | 154 | 0 | 242 | 120 | 0 | 0 | 120 | 0 | 163 | 92 | 255 | 731 |
| Total | 456 | 0 | 0 | 456 | 448 | 645 | 0 | 1093 | 527 | 0 | 0 | 527 | 0 | 793 | 426 | 1219 | 3295 |
| Grand Total | 870 | 0 | 0 | 870 | 942 | 1345 | 0 | 2287 | 1079 | 0 | 0 | 1079 | 0 | 1609 | 946 | 2555 | 6791 |
| Apprch % | 100 | 0 | 0 | | 41.2 | 58.8 | 0 | | 100 | 0 | 0 | | 0 | 63 | 37 | | |
| Total % | 12.8 | 0 | 0 | 12.8 | 13.9 | 19.8 | 0 | 33.7 | 15.9 | 0 | 0 | 15.9 | 0 | 23.7 | 13.9 | 37.6 | |

| Start Time | I-880 NB RAMPS Southbound | | | | MARINA BLVD Westbound | | | | I-880 NB OFF-RAMP Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--|------------------------------|------|------|------------|--------------------------|------------|------|------------|---------------------------------|------|------|------------|--------------------------|------------|------------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 16:30 | | | | | | | | | | | | | | | | | |
| 16:30 | 101 | 0 | 0 | 101 | 135 | 181 | 0 | 316 | 141 | 0 | 0 | 141 | 0 | 212 | 136 | 348 | 906 |
| 16:45 | 118 | 0 | 0 | 118 | 117 | 174 | 0 | 291 | 143 | 0 | 0 | 143 | 0 | 199 | 108 | 307 | 859 |
| 17:00 | 112 | 0 | 0 | 112 | 132 | 166 | 0 | 298 | 121 | 0 | 0 | 121 | 0 | 206 | 126 | 332 | 863 |
| 17:15 | 125 | 0 | 0 | 125 | 118 | 157 | 0 | 275 | 167 | 0 | 0 | 167 | 0 | 222 | 102 | 324 | 891 |
| Total Volume | 456 | 0 | 0 | 456 | 502 | 678 | 0 | 1180 | 572 | 0 | 0 | 572 | 0 | 839 | 472 | 1311 | 3519 |
| % App. Total | 100 | 0 | 0 | | 42.5 | 57.5 | 0 | | 100 | 0 | 0 | | 0 | 64 | 36 | | |
| PHF | .912 | .000 | .000 | .912 | .930 | .936 | .000 | .934 | .856 | .000 | .000 | .856 | .000 | .945 | .868 | .942 | .971 |



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880nb-marina-s
Site Code : 21
Start Date : 1/26/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | I-880 NB RAMPS Southbound | | | | MARINA BLVD Westbound | | | | I-880 NB OFF-RAMP Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|-------------|------------------------------|----|----|------------|--------------------------|------|----|------------|---------------------------------|----|----|------------|--------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 85 | 0 | 0 | 85 | 55 | 103 | 0 | 158 | 95 | 0 | 0 | 95 | 0 | 140 | 77 | 217 | 555 |
| 10:15 | 97 | 0 | 0 | 97 | 99 | 132 | 0 | 231 | 115 | 0 | 0 | 115 | 0 | 164 | 79 | 243 | 686 |
| 10:30 | 70 | 0 | 0 | 70 | 83 | 134 | 0 | 217 | 133 | 0 | 0 | 133 | 0 | 160 | 102 | 262 | 682 |
| 10:45 | 101 | 0 | 0 | 101 | 98 | 135 | 0 | 233 | 131 | 0 | 0 | 131 | 0 | 161 | 87 | 248 | 713 |
| Total | 353 | 0 | 0 | 353 | 335 | 504 | 0 | 839 | 474 | 0 | 0 | 474 | 0 | 625 | 345 | 970 | 2636 |
| 11:00 | 102 | 0 | 0 | 102 | 101 | 160 | 0 | 261 | 124 | 0 | 0 | 124 | 0 | 174 | 92 | 266 | 753 |
| 11:15 | 89 | 0 | 0 | 89 | 104 | 185 | 0 | 289 | 157 | 0 | 0 | 157 | 0 | 164 | 101 | 265 | 800 |
| 11:30 | 105 | 0 | 0 | 105 | 114 | 175 | 0 | 289 | 123 | 0 | 0 | 123 | 0 | 198 | 80 | 278 | 795 |
| 11:45 | 96 | 0 | 0 | 96 | 112 | 187 | 0 | 299 | 134 | 0 | 0 | 134 | 0 | 204 | 84 | 288 | 817 |
| Total | 392 | 0 | 0 | 392 | 431 | 707 | 0 | 1138 | 538 | 0 | 0 | 538 | 0 | 740 | 357 | 1097 | 3165 |
| 12:00 | 80 | 0 | 0 | 80 | 107 | 185 | 0 | 292 | 146 | 0 | 0 | 146 | 0 | 190 | 83 | 273 | 791 |
| 12:15 | 96 | 0 | 0 | 96 | 128 | 195 | 0 | 323 | 178 | 0 | 0 | 178 | 0 | 186 | 81 | 267 | 864 |
| 12:30 | 95 | 0 | 0 | 95 | 113 | 209 | 0 | 322 | 135 | 0 | 0 | 135 | 0 | 212 | 88 | 300 | 852 |
| 12:45 | 98 | 0 | 0 | 98 | 91 | 193 | 0 | 284 | 162 | 0 | 0 | 162 | 0 | 209 | 88 | 297 | 841 |
| Total | 369 | 0 | 0 | 369 | 439 | 782 | 0 | 1221 | 621 | 0 | 0 | 621 | 0 | 797 | 340 | 1137 | 3348 |
| 13:00 | 106 | 0 | 0 | 106 | 130 | 204 | 0 | 334 | 164 | 0 | 0 | 164 | 0 | 199 | 89 | 288 | 892 |
| 13:15 | 97 | 0 | 0 | 97 | 135 | 208 | 0 | 343 | 146 | 0 | 0 | 146 | 0 | 232 | 90 | 322 | 908 |
| 13:30 | 95 | 0 | 0 | 95 | 131 | 196 | 0 | 327 | 147 | 0 | 0 | 147 | 0 | 180 | 112 | 292 | 861 |
| 13:45 | 139 | 0 | 0 | 139 | 123 | 154 | 0 | 277 | 166 | 0 | 0 | 166 | 0 | 214 | 89 | 303 | 885 |
| Total | 437 | 0 | 0 | 437 | 519 | 762 | 0 | 1281 | 623 | 0 | 0 | 623 | 0 | 825 | 380 | 1205 | 3546 |
| Grand Total | 1551 | 0 | 0 | 1551 | 1724 | 2755 | 0 | 4479 | 2256 | 0 | 0 | 2256 | 0 | 2987 | 1422 | 4409 | 12695 |
| Apprch % | 100 | 0 | 0 | | 38.5 | 61.5 | 0 | | 100 | 0 | 0 | | 0 | 67.7 | 32.3 | | |
| Total % | 12.2 | 0 | 0 | 12.2 | 13.6 | 21.7 | 0 | 35.3 | 17.8 | 0 | 0 | 17.8 | 0 | 23.5 | 11.2 | 34.7 | |

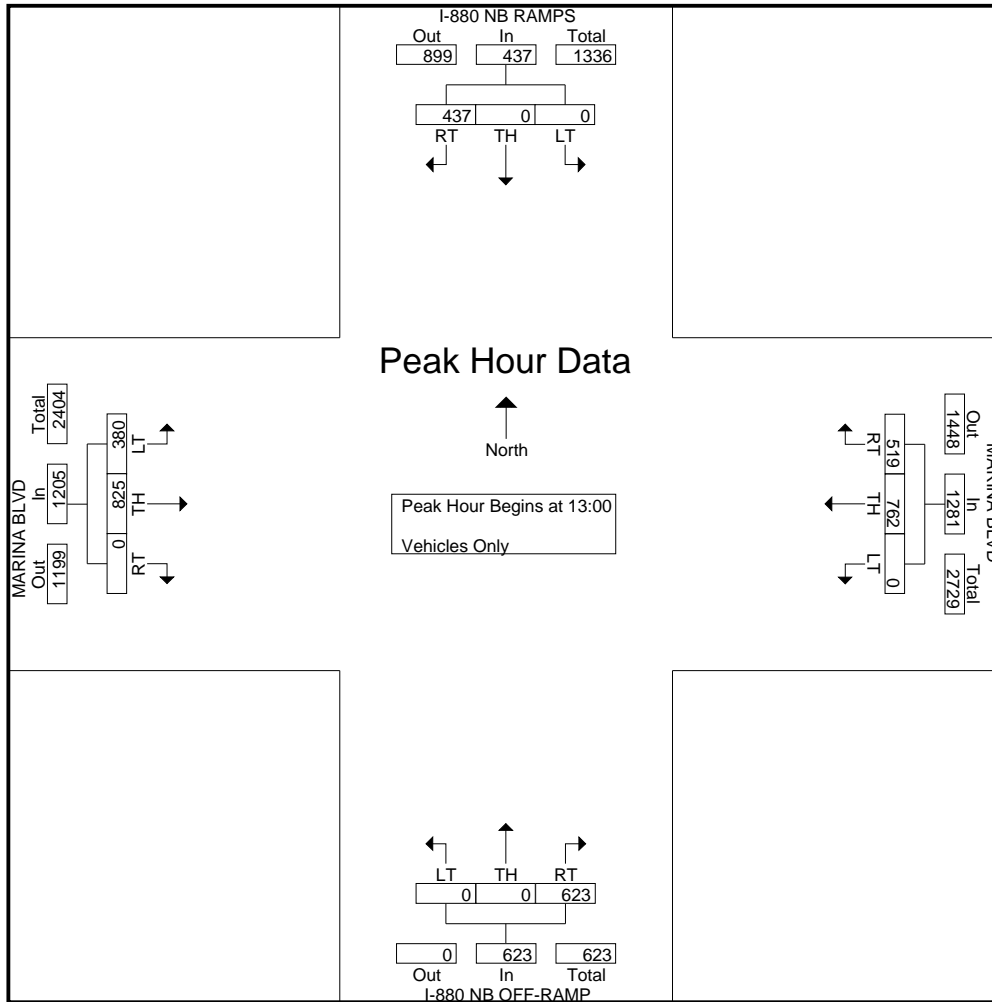
| Start Time | I-880 NB RAMPS Southbound | | | | MARINA BLVD Westbound | | | | I-880 NB OFF-RAMP Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--|------------------------------|------|------|------------|--------------------------|------------|------|------------|---------------------------------|------|------|------------|--------------------------|------------|------------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 13:00 | | | | | | | | | | | | | | | | | |
| 13:00 | 106 | 0 | 0 | 106 | 130 | 204 | 0 | 334 | 164 | 0 | 0 | 164 | 0 | 199 | 89 | 288 | 892 |
| 13:15 | 97 | 0 | 0 | 97 | 135 | 208 | 0 | 343 | 146 | 0 | 0 | 146 | 0 | 232 | 90 | 322 | 908 |
| 13:30 | 95 | 0 | 0 | 95 | 131 | 196 | 0 | 327 | 147 | 0 | 0 | 147 | 0 | 180 | 112 | 292 | 861 |
| 13:45 | 139 | 0 | 0 | 139 | 123 | 154 | 0 | 277 | 166 | 0 | 0 | 166 | 0 | 214 | 89 | 303 | 885 |
| Total Volume | 437 | 0 | 0 | 437 | 519 | 762 | 0 | 1281 | 623 | 0 | 0 | 623 | 0 | 825 | 380 | 1205 | 3546 |
| % App. Total | 100 | 0 | 0 | | 40.5 | 59.5 | 0 | | 100 | 0 | 0 | | 0 | 68.5 | 31.5 | | |
| PHF | .786 | .000 | .000 | .786 | .961 | .916 | .000 | .934 | .938 | .000 | .000 | .938 | .000 | .889 | .848 | .936 | .976 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : 880nb-marina-s
Site Code : 21
Start Date : 1/26/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

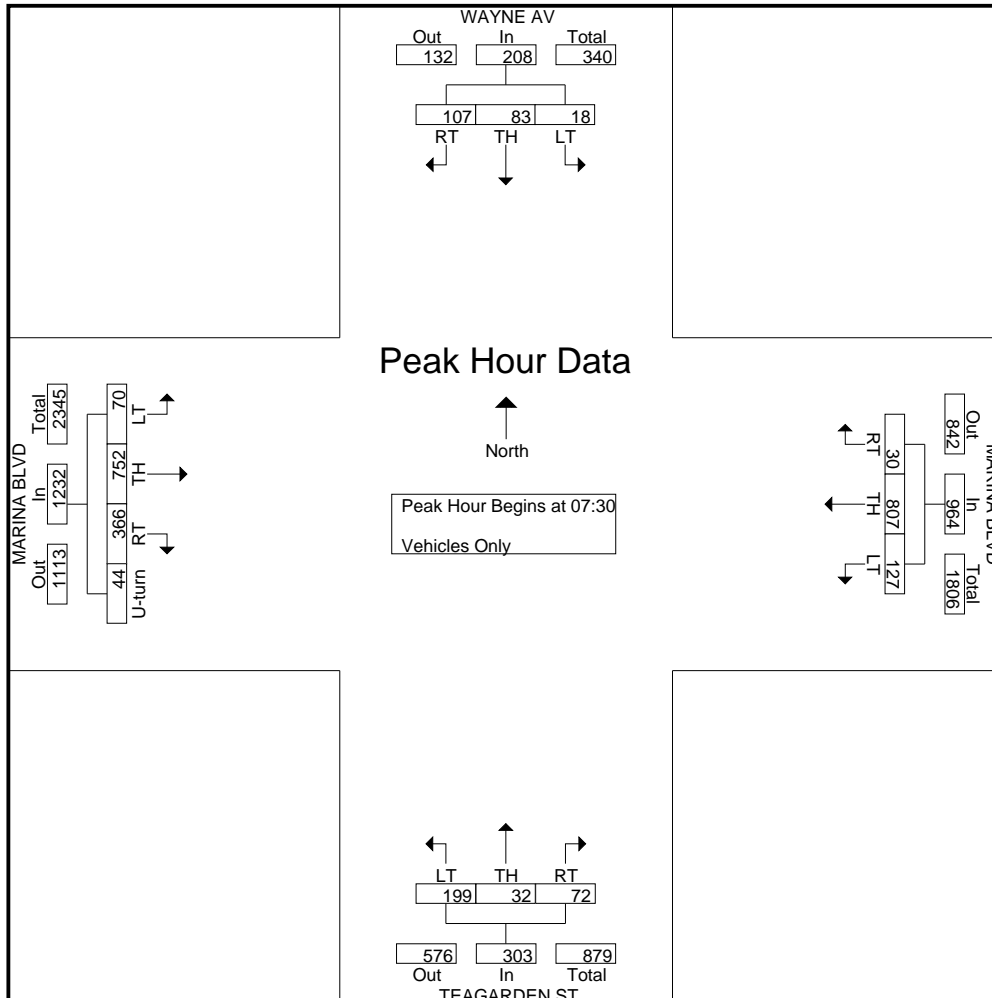
CITY OF SAN LEANDRO
Shoreline EIR

File Name : teagarden-marina-a
Site Code : 11
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | WAYNE AV Southbound | | | | MARINA BLVD Westbound | | | | TEAGARDEN ST Northbound | | | | MARINA BLVD Eastbound | | | | | Int. Total |
|--------------------|------------------------|------------|-----------|------------|--------------------------|-------------|------------|-------------|----------------------------|-----------|------------|------------|--------------------------|-------------|------------|-----------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| 07:00 | 16 | 9 | 1 | 26 | 4 | 128 | 18 | 150 | 8 | 1 | 35 | 44 | 95 | 104 | 11 | 14 | 224 | 444 |
| 07:15 | 17 | 10 | 4 | 31 | 1 | 131 | 17 | 149 | 8 | 8 | 33 | 49 | 86 | 98 | 20 | 9 | 213 | 442 |
| 07:30 | 20 | 8 | 2 | 30 | 4 | 184 | 28 | 216 | 11 | 8 | 41 | 60 | 87 | 153 | 13 | 9 | 262 | 568 |
| 07:45 | 24 | 23 | 4 | 51 | 7 | 183 | 38 | 228 | 21 | 6 | 44 | 71 | 107 | 210 | 20 | 7 | 344 | 694 |
| Total | 77 | 50 | 11 | 138 | 16 | 626 | 101 | 743 | 48 | 23 | 153 | 224 | 375 | 565 | 64 | 39 | 1043 | 2148 |
| 08:00 | 33 | 29 | 10 | 72 | 13 | 231 | 34 | 278 | 21 | 12 | 58 | 91 | 96 | 199 | 19 | 15 | 329 | 770 |
| 08:15 | 30 | 23 | 2 | 55 | 6 | 209 | 27 | 242 | 19 | 6 | 56 | 81 | 76 | 190 | 18 | 13 | 297 | 675 |
| 08:30 | 20 | 5 | 6 | 31 | 6 | 143 | 16 | 165 | 23 | 8 | 46 | 77 | 80 | 178 | 12 | 12 | 282 | 555 |
| 08:45 | 15 | 7 | 9 | 31 | 9 | 140 | 24 | 173 | 17 | 7 | 48 | 72 | 71 | 145 | 16 | 10 | 242 | 518 |
| Total | 98 | 64 | 27 | 189 | 34 | 723 | 101 | 858 | 80 | 33 | 208 | 321 | 323 | 712 | 65 | 50 | 1150 | 2518 |
| Grand Total | 175 | 114 | 38 | 327 | 50 | 1349 | 202 | 1601 | 128 | 56 | 361 | 545 | 698 | 1277 | 129 | 89 | 2193 | 4666 |
| Apprch % | 53.5 | 34.9 | 11.6 | | 3.1 | 84.3 | 12.6 | | 23.5 | 10.3 | 66.2 | | 31.8 | 58.2 | 5.9 | 4.1 | | |
| Total % | 3.8 | 2.4 | 0.8 | 7 | 1.1 | 28.9 | 4.3 | 34.3 | 2.7 | 1.2 | 7.7 | 11.7 | 15 | 27.4 | 2.8 | 1.9 | 47 | |

| Start Time | WAYNE AV Southbound | | | | MARINA BLVD Westbound | | | | TEAGARDEN ST Northbound | | | | MARINA BLVD Eastbound | | | | | Int. Total |
|--|------------------------|-----------|-----------|------------|--------------------------|------------|-----------|------------|----------------------------|-----------|-----------|------------|--------------------------|------------|-----------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 | | | | | | | | | | | | | | | | | | |
| 07:30 | 20 | 8 | 2 | 30 | 4 | 184 | 28 | 216 | 11 | 8 | 41 | 60 | 87 | 153 | 13 | 9 | 262 | 568 |
| 07:45 | 24 | 23 | 4 | 51 | 7 | 183 | 38 | 228 | 21 | 6 | 44 | 71 | 107 | 210 | 20 | 7 | 344 | 694 |
| 08:00 | 33 | 29 | 10 | 72 | 13 | 231 | 34 | 278 | 21 | 12 | 58 | 91 | 96 | 199 | 19 | 15 | 329 | 770 |
| 08:15 | 30 | 23 | 2 | 55 | 6 | 209 | 27 | 242 | 19 | 6 | 56 | 81 | 76 | 190 | 18 | 13 | 297 | 675 |
| Total Volume | 107 | 83 | 18 | 208 | 30 | 807 | 127 | 964 | 72 | 32 | 199 | 303 | 366 | 752 | 70 | 44 | 1232 | 2707 |
| % App. Total | 51.4 | 39.9 | 8.7 | | 3.1 | 83.7 | 13.2 | | 23.8 | 10.6 | 65.7 | | 29.7 | 61 | 5.7 | 3.6 | | |
| PHF | .811 | .716 | .450 | .722 | .577 | .873 | .836 | .867 | .857 | .667 | .858 | .832 | .855 | .895 | .875 | .733 | .895 | .879 |



MARKS TRAFFIC DATA
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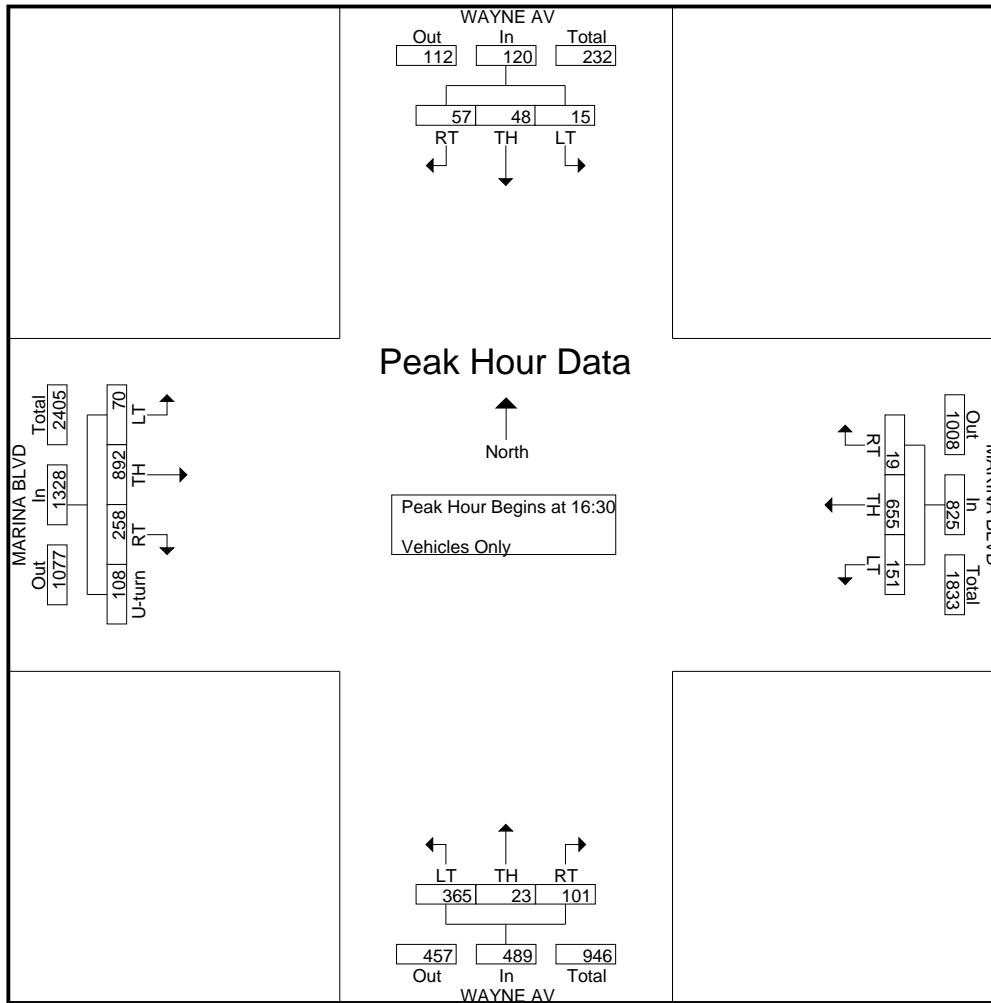
CITY OF SAN LEANDRO
Shoreline EIR

File Name : teagarden-marina-p
Site Code : 11
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | WAYNE AV Southbound | | | | MARINA BLVD Westbound | | | | WAYNE AV Northbound | | | | MARINA BLVD Eastbound | | | | | Int. Total |
|-------------|---------------------|------|------|------------|-----------------------|------|------|------------|---------------------|-----|------|------------|-----------------------|------|-----|--------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| 16:00 | 10 | 8 | 6 | 24 | 5 | 158 | 23 | 186 | 26 | 4 | 89 | 119 | 63 | 202 | 20 | 50 | 335 | 664 |
| 16:15 | 17 | 10 | 4 | 31 | 2 | 137 | 32 | 171 | 21 | 6 | 88 | 115 | 74 | 191 | 21 | 23 | 309 | 626 |
| 16:30 | 19 | 18 | 5 | 42 | 8 | 183 | 33 | 224 | 22 | 5 | 95 | 122 | 70 | 237 | 10 | 32 | 349 | 737 |
| 16:45 | 16 | 2 | 4 | 22 | 1 | 150 | 34 | 185 | 19 | 5 | 89 | 113 | 54 | 195 | 24 | 29 | 302 | 622 |
| Total | 62 | 38 | 19 | 119 | 16 | 628 | 122 | 766 | 88 | 20 | 361 | 469 | 261 | 825 | 75 | 134 | 1295 | 2649 |
| 17:00 | 9 | 20 | 2 | 31 | 5 | 172 | 41 | 218 | 33 | 10 | 103 | 146 | 72 | 223 | 16 | 20 | 331 | 726 |
| 17:15 | 13 | 8 | 4 | 25 | 5 | 150 | 43 | 198 | 27 | 3 | 78 | 108 | 62 | 237 | 20 | 27 | 346 | 677 |
| 17:30 | 9 | 16 | 11 | 36 | 7 | 145 | 43 | 195 | 33 | 10 | 76 | 119 | 51 | 212 | 22 | 29 | 314 | 664 |
| 17:45 | 10 | 8 | 7 | 25 | 3 | 146 | 33 | 182 | 27 | 8 | 66 | 101 | 61 | 201 | 10 | 16 | 288 | 596 |
| Total | 41 | 52 | 24 | 117 | 20 | 613 | 160 | 793 | 120 | 31 | 323 | 474 | 246 | 873 | 68 | 92 | 1279 | 2663 |
| Grand Total | 103 | 90 | 43 | 236 | 36 | 1241 | 282 | 1559 | 208 | 51 | 684 | 943 | 507 | 1698 | 143 | 226 | 2574 | 5312 |
| Apprch % | 43.6 | 38.1 | 18.2 | | 2.3 | 79.6 | 18.1 | | 22.1 | 5.4 | 72.5 | | 19.7 | 66 | 5.6 | 8.8 | | |
| Total % | 1.9 | 1.7 | 0.8 | 4.4 | 0.7 | 23.4 | 5.3 | 29.3 | 3.9 | 1 | 12.9 | 17.8 | 9.5 | 32 | 2.7 | 4.3 | 48.5 | |

| Start Time | WAYNE AV Southbound | | | | MARINA BLVD Westbound | | | | WAYNE AV Northbound | | | | MARINA BLVD Eastbound | | | | | Int. Total |
|--|---------------------|------|------|------------|-----------------------|------|------|------------|---------------------|------|------|------------|-----------------------|------|------|--------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 16:30 | | | | | | | | | | | | | | | | | | |
| 16:30 | 19 | 18 | 5 | 42 | 8 | 183 | 33 | 224 | 22 | 5 | 95 | 122 | 70 | 237 | 10 | 32 | 349 | 737 |
| 16:45 | 16 | 2 | 4 | 22 | 1 | 150 | 34 | 185 | 19 | 5 | 89 | 113 | 54 | 195 | 24 | 29 | 302 | 622 |
| 17:00 | 9 | 20 | 2 | 31 | 5 | 172 | 41 | 218 | 33 | 10 | 103 | 146 | 72 | 223 | 16 | 20 | 331 | 726 |
| 17:15 | 13 | 8 | 4 | 25 | 5 | 150 | 43 | 198 | 27 | 3 | 78 | 108 | 62 | 237 | 20 | 27 | 346 | 677 |
| Total Volume | 57 | 48 | 15 | 120 | 19 | 655 | 151 | 825 | 101 | 23 | 365 | 489 | 258 | 892 | 70 | 108 | 1328 | 2762 |
| % App. Total | 47.5 | 40 | 12.5 | | 2.3 | 79.4 | 18.3 | | 20.7 | 4.7 | 74.6 | | 19.4 | 67.2 | 5.3 | 8.1 | | |
| PHF | .750 | .600 | .750 | .714 | .594 | .895 | .878 | .921 | .765 | .575 | .886 | .837 | .896 | .941 | .729 | .844 | .951 | .937 |



MARKS TRAFFIC DATA

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916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : teagarden-marina-s
Site Code : 11
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | WAYNE AVE Southbound | | | | MARINA BLVD Westbound | | | | TEAGARDEN ST Northbound | | | | MARINA BLVD Eastbound | | | | | Int. Total |
|--------------------|-------------------------|------------|-----------|------------|--------------------------|-------------|------------|-------------|----------------------------|-----------|-------------|-------------|--------------------------|-------------|------------|------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| 10:00 | 22 | 6 | 6 | 34 | 2 | 131 | 31 | 164 | 11 | 4 | 47 | 62 | 28 | 116 | 21 | 21 | 186 | 446 |
| 10:15 | 18 | 9 | 5 | 32 | 4 | 152 | 27 | 183 | 16 | 8 | 47 | 71 | 36 | 147 | 11 | 24 | 218 | 504 |
| 10:30 | 12 | 3 | 5 | 20 | 3 | 155 | 37 | 195 | 10 | 2 | 46 | 58 | 41 | 175 | 18 | 32 | 266 | 539 |
| 10:45 | 15 | 12 | 5 | 32 | 4 | 141 | 23 | 168 | 21 | 4 | 60 | 85 | 43 | 157 | 17 | 33 | 250 | 535 |
| Total | 67 | 30 | 21 | 118 | 13 | 579 | 118 | 710 | 58 | 18 | 200 | 276 | 148 | 595 | 67 | 110 | 920 | 2024 |
| 11:00 | 17 | 6 | 3 | 26 | 8 | 170 | 35 | 213 | 9 | 2 | 60 | 71 | 41 | 143 | 14 | 41 | 239 | 549 |
| 11:15 | 17 | 13 | 6 | 36 | 6 | 137 | 28 | 171 | 14 | 7 | 64 | 85 | 53 | 171 | 23 | 36 | 283 | 575 |
| 11:30 | 18 | 11 | 4 | 33 | 9 | 156 | 35 | 200 | 20 | 5 | 82 | 107 | 60 | 170 | 18 | 49 | 297 | 637 |
| 11:45 | 22 | 11 | 4 | 37 | 6 | 164 | 42 | 212 | 19 | 9 | 79 | 107 | 56 | 194 | 12 | 63 | 325 | 681 |
| Total | 74 | 41 | 17 | 132 | 29 | 627 | 140 | 796 | 62 | 23 | 285 | 370 | 210 | 678 | 67 | 189 | 1144 | 2442 |
| 12:00 | 17 | 11 | 6 | 34 | 6 | 158 | 48 | 212 | 27 | 5 | 70 | 102 | 48 | 167 | 14 | 47 | 276 | 624 |
| 12:15 | 23 | 10 | 12 | 45 | 8 | 175 | 50 | 233 | 33 | 4 | 86 | 123 | 44 | 190 | 15 | 37 | 286 | 687 |
| 12:30 | 11 | 5 | 5 | 21 | 7 | 172 | 43 | 222 | 24 | 4 | 72 | 100 | 46 | 191 | 9 | 46 | 292 | 635 |
| 12:45 | 17 | 8 | 4 | 29 | 5 | 162 | 41 | 208 | 25 | 6 | 86 | 117 | 56 | 206 | 13 | 45 | 320 | 674 |
| Total | 68 | 34 | 27 | 129 | 26 | 667 | 182 | 875 | 109 | 19 | 314 | 442 | 194 | 754 | 51 | 175 | 1174 | 2620 |
| 13:00 | 15 | 11 | 6 | 32 | 6 | 167 | 47 | 220 | 18 | 9 | 75 | 102 | 53 | 191 | 22 | 61 | 327 | 681 |
| 13:15 | 9 | 9 | 6 | 24 | 3 | 195 | 39 | 237 | 27 | 5 | 109 | 141 | 49 | 175 | 12 | 53 | 289 | 691 |
| 13:30 | 17 | 5 | 5 | 27 | 7 | 196 | 44 | 247 | 24 | 4 | 104 | 132 | 37 | 206 | 23 | 52 | 318 | 724 |
| 13:45 | 18 | 8 | 3 | 29 | 4 | 199 | 35 | 238 | 24 | 2 | 87 | 113 | 55 | 178 | 15 | 60 | 308 | 688 |
| Total | 59 | 33 | 20 | 112 | 20 | 757 | 165 | 942 | 93 | 20 | 375 | 488 | 194 | 750 | 72 | 226 | 1242 | 2784 |
| Grand Total | 268 | 138 | 85 | 491 | 88 | 2630 | 605 | 3323 | 322 | 80 | 1174 | 1576 | 746 | 2777 | 257 | 700 | 4480 | 9870 |
| Apprch % | 54.6 | 28.1 | 17.3 | | 2.6 | 79.1 | 18.2 | | 20.4 | 5.1 | 74.5 | | 16.7 | 62 | 5.7 | 15.6 | | |
| Total % | 2.7 | 1.4 | 0.9 | 5 | 0.9 | 26.6 | 6.1 | 33.7 | 3.3 | 0.8 | 11.9 | 16 | 7.6 | 28.1 | 2.6 | 7.1 | 45.4 | |

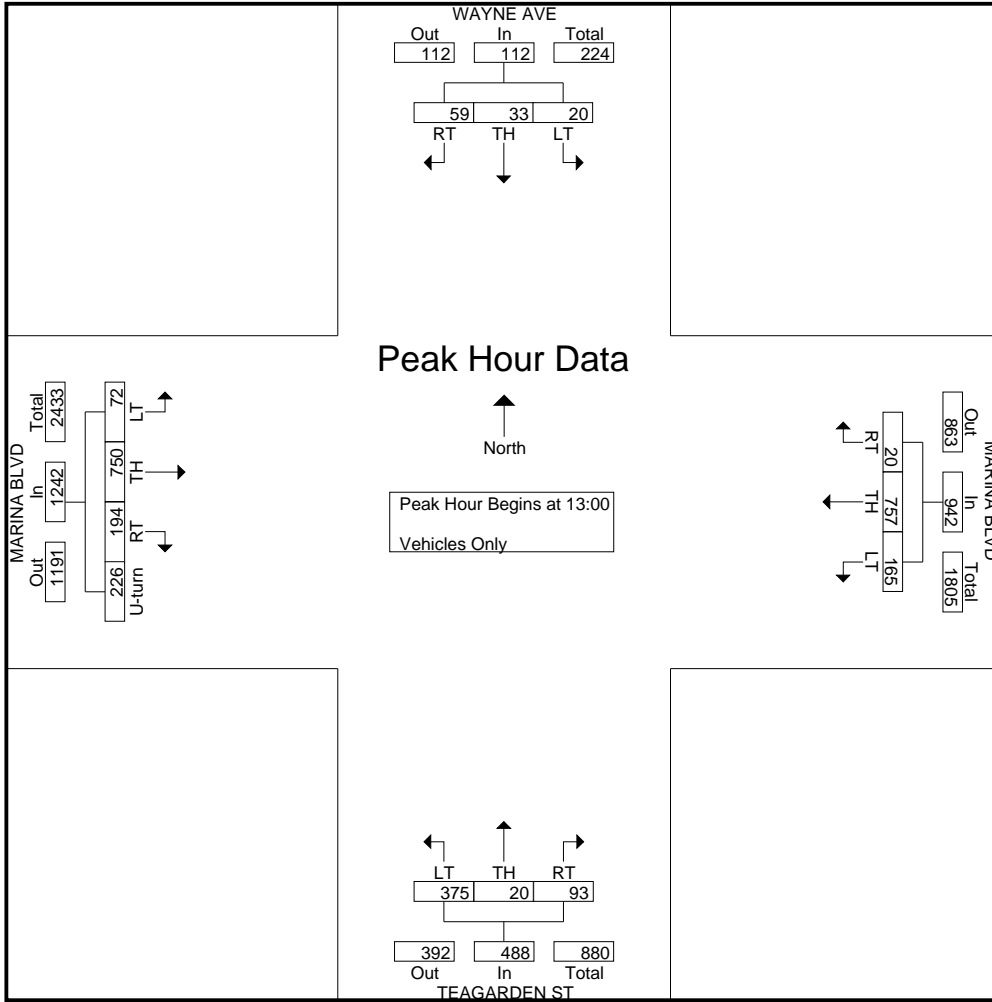
| Start Time | WAYNE AVE Southbound | | | | MARINA BLVD Westbound | | | | TEAGARDEN ST Northbound | | | | MARINA BLVD Eastbound | | | | | Int. Total |
|--|-------------------------|-----------|-----------|------------|--------------------------|------------|------------|------------|----------------------------|-----------|------------|------------|--------------------------|------------|-----------|------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | U-turn | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 13:00 | | | | | | | | | | | | | | | | | | |
| 13:00 | 15 | 11 | 6 | 32 | 6 | 167 | 47 | 220 | 18 | 9 | 75 | 102 | 53 | 191 | 22 | 61 | 327 | 681 |
| 13:15 | 9 | 9 | 6 | 24 | 3 | 195 | 39 | 237 | 27 | 5 | 109 | 141 | 49 | 175 | 12 | 53 | 289 | 691 |
| 13:30 | 17 | 5 | 5 | 27 | 7 | 196 | 44 | 247 | 24 | 4 | 104 | 132 | 37 | 206 | 23 | 52 | 318 | 724 |
| 13:45 | 18 | 8 | 3 | 29 | 4 | 199 | 35 | 238 | 24 | 2 | 87 | 113 | 55 | 178 | 15 | 60 | 308 | 688 |
| Total Volume | 59 | 33 | 20 | 112 | 20 | 757 | 165 | 942 | 93 | 20 | 375 | 488 | 194 | 750 | 72 | 226 | 1242 | 2784 |
| % App. Total | 52.7 | 29.5 | 17.9 | | 2.1 | 80.4 | 17.5 | | 19.1 | 4.1 | 76.8 | | 15.6 | 60.4 | 5.8 | 18.2 | | |
| PHF | .819 | .750 | .833 | .875 | .714 | .951 | .878 | .953 | .861 | .556 | .860 | .865 | .882 | .910 | .783 | .926 | .950 | .961 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : teagarden-marina-s
Site Code : 11
Start Date : 2/2/2013
Page No : 2



MARKS TRAFFIC DATA

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916.806.0250

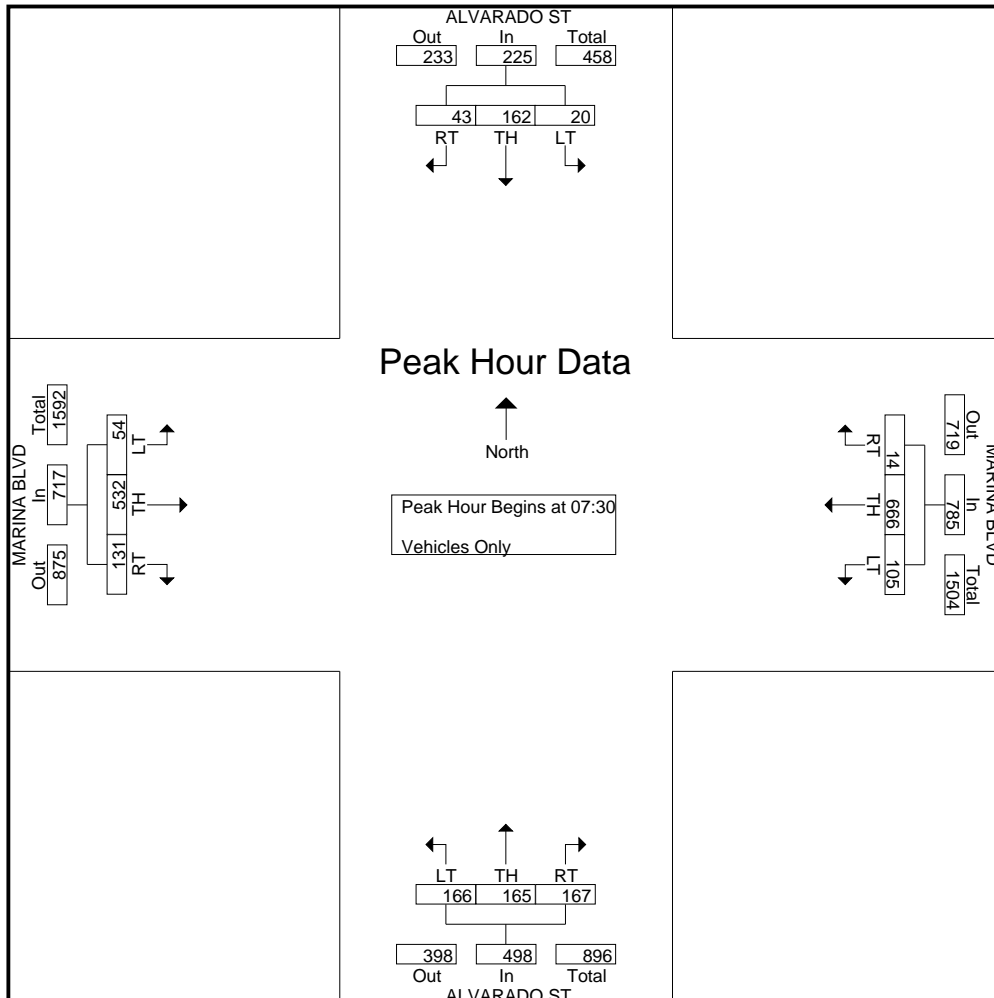
CITY OF SAN LEANDRO
Shoreline EIR

File Name : alvarado-marina-a
Site Code : 12
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | ALVARADO ST Southbound | | | | MARINA BLVD Westbound | | | | ALVARADO ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|---------------------------|------------|-----------|------------|--------------------------|-------------|------------|-------------|---------------------------|------------|------------|------------|--------------------------|------------|------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 12 | 13 | 3 | 28 | 2 | 81 | 17 | 100 | 23 | 22 | 48 | 93 | 21 | 52 | 8 | 81 | 302 |
| 07:15 | 17 | 25 | 6 | 48 | 3 | 89 | 18 | 110 | 28 | 21 | 35 | 84 | 19 | 59 | 14 | 92 | 334 |
| 07:30 | 10 | 28 | 2 | 40 | 2 | 124 | 23 | 149 | 31 | 36 | 52 | 119 | 23 | 92 | 16 | 131 | 439 |
| 07:45 | 8 | 37 | 6 | 51 | 4 | 190 | 27 | 221 | 55 | 37 | 36 | 128 | 42 | 158 | 15 | 215 | 615 |
| Total | 47 | 103 | 17 | 167 | 11 | 484 | 85 | 580 | 137 | 116 | 171 | 424 | 105 | 361 | 53 | 519 | 1690 |
| 08:00 | 14 | 54 | 5 | 73 | 6 | 186 | 28 | 220 | 46 | 48 | 46 | 140 | 36 | 141 | 10 | 187 | 620 |
| 08:15 | 11 | 43 | 7 | 61 | 2 | 166 | 27 | 195 | 35 | 44 | 32 | 111 | 30 | 141 | 13 | 184 | 551 |
| 08:30 | 8 | 26 | 8 | 42 | 3 | 90 | 12 | 105 | 28 | 26 | 36 | 90 | 27 | 140 | 28 | 195 | 432 |
| 08:45 | 15 | 21 | 8 | 44 | 5 | 117 | 23 | 145 | 26 | 11 | 26 | 63 | 23 | 108 | 18 | 149 | 401 |
| Total | 48 | 144 | 28 | 220 | 16 | 559 | 90 | 665 | 135 | 129 | 140 | 404 | 116 | 530 | 69 | 715 | 2004 |
| Grand Total | 95 | 247 | 45 | 387 | 27 | 1043 | 175 | 1245 | 272 | 245 | 311 | 828 | 221 | 891 | 122 | 1234 | 3694 |
| Apprch % | 24.5 | 63.8 | 11.6 | | 2.2 | 83.8 | 14.1 | | 32.9 | 29.6 | 37.6 | | 17.9 | 72.2 | 9.9 | | |
| Total % | 2.6 | 6.7 | 1.2 | 10.5 | 0.7 | 28.2 | 4.7 | 33.7 | 7.4 | 6.6 | 8.4 | 22.4 | 6 | 24.1 | 3.3 | 33.4 | |

| Start Time | ALVARADO ST Southbound | | | | MARINA BLVD Westbound | | | | ALVARADO ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--|---------------------------|-----------|------|------------|--------------------------|------------|-----------|------------|---------------------------|-----------|-----------|------------|--------------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 | | | | | | | | | | | | | | | | | |
| 07:30 | 10 | 28 | 2 | 40 | 2 | 124 | 23 | 149 | 31 | 36 | 52 | 119 | 23 | 92 | 16 | 131 | 439 |
| 07:45 | 8 | 37 | 6 | 51 | 4 | 190 | 27 | 221 | 55 | 37 | 36 | 128 | 42 | 158 | 15 | 215 | 615 |
| 08:00 | 14 | 54 | 5 | 73 | 6 | 186 | 28 | 220 | 46 | 48 | 46 | 140 | 36 | 141 | 10 | 187 | 620 |
| 08:15 | 11 | 43 | 7 | 61 | 2 | 166 | 27 | 195 | 35 | 44 | 32 | 111 | 30 | 141 | 13 | 184 | 551 |
| Total Volume | 43 | 162 | 20 | 225 | 14 | 666 | 105 | 785 | 167 | 165 | 166 | 498 | 131 | 532 | 54 | 717 | 2225 |
| % App. Total | 19.1 | 72 | 8.9 | | 1.8 | 84.8 | 13.4 | | 33.5 | 33.1 | 33.3 | | 18.3 | 74.2 | 7.5 | | |
| PHF | .768 | .750 | .714 | .771 | .583 | .876 | .938 | .888 | .759 | .859 | .798 | .889 | .780 | .842 | .844 | .834 | .897 |



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

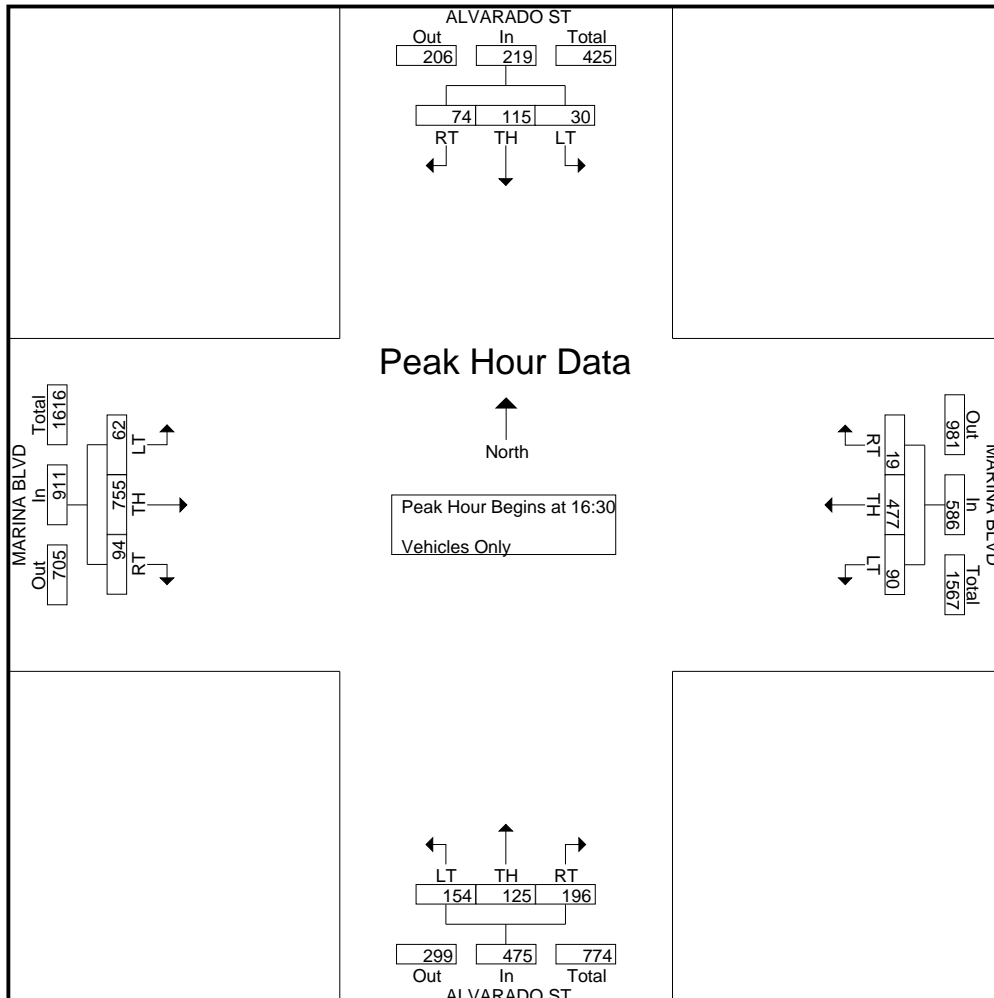
File Name : alvarado-marina-p
Site Code : 12
Start Date : 1/16/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | ALVARADO ST Southbound | | | | MARINA BLVD Westbound | | | | ALVARADO ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|---------------------------|------------|-----------|------------|--------------------------|------------|------------|-------------|---------------------------|------------|------------|------------|--------------------------|-------------|------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 19 | 25 | 9 | 53 | 9 | 103 | 16 | 128 | 42 | 36 | 31 | 109 | 26 | 166 | 20 | 212 | 502 |
| 16:15 | 12 | 27 | 7 | 46 | 6 | 104 | 17 | 127 | 37 | 17 | 40 | 94 | 31 | 174 | 16 | 221 | 488 |
| 16:30 | 15 | 20 | 7 | 42 | 4 | 129 | 21 | 154 | 51 | 26 | 37 | 114 | 29 | 201 | 16 | 246 | 556 |
| 16:45 | 14 | 23 | 11 | 48 | 3 | 123 | 24 | 150 | 37 | 30 | 39 | 106 | 22 | 164 | 15 | 201 | 505 |
| Total | 60 | 95 | 34 | 189 | 22 | 459 | 78 | 559 | 167 | 109 | 147 | 423 | 108 | 705 | 67 | 880 | 2051 |
| 17:00 | 20 | 39 | 9 | 68 | 5 | 112 | 20 | 137 | 64 | 34 | 46 | 144 | 17 | 200 | 11 | 228 | 577 |
| 17:15 | 25 | 33 | 3 | 61 | 7 | 113 | 25 | 145 | 44 | 35 | 32 | 111 | 26 | 190 | 20 | 236 | 553 |
| 17:30 | 23 | 33 | 10 | 66 | 7 | 106 | 14 | 127 | 41 | 38 | 31 | 110 | 28 | 194 | 17 | 239 | 542 |
| 17:45 | 21 | 29 | 10 | 60 | 5 | 130 | 19 | 154 | 21 | 33 | 29 | 83 | 21 | 173 | 14 | 208 | 505 |
| Total | 89 | 134 | 32 | 255 | 24 | 461 | 78 | 563 | 170 | 140 | 138 | 448 | 92 | 757 | 62 | 911 | 2177 |
| Grand Total | 149 | 229 | 66 | 444 | 46 | 920 | 156 | 1122 | 337 | 249 | 285 | 871 | 200 | 1462 | 129 | 1791 | 4228 |
| Apprch % | 33.6 | 51.6 | 14.9 | | 4.1 | 82 | 13.9 | | 38.7 | 28.6 | 32.7 | | 11.2 | 81.6 | 7.2 | | |
| Total % | 3.5 | 5.4 | 1.6 | 10.5 | 1.1 | 21.8 | 3.7 | 26.5 | 8 | 5.9 | 6.7 | 20.6 | 4.7 | 34.6 | 3.1 | 42.4 | |

| Start Time | ALVARADO ST Southbound | | | | MARINA BLVD Westbound | | | | ALVARADO ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|---------------------|---------------------------|------------|-----------|------------|--------------------------|------------|-----------|------------|---------------------------|------------|------------|------------|--------------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:30 | 15 | 20 | 7 | 42 | 4 | 129 | 21 | 154 | 51 | 26 | 37 | 114 | 29 | 201 | 16 | 246 | 556 |
| 16:45 | 14 | 23 | 11 | 48 | 3 | 123 | 24 | 150 | 37 | 30 | 39 | 106 | 22 | 164 | 15 | 201 | 505 |
| 17:00 | 20 | 39 | 9 | 68 | 5 | 112 | 20 | 137 | 64 | 34 | 46 | 144 | 17 | 200 | 11 | 228 | 577 |
| 17:15 | 25 | 33 | 3 | 61 | 7 | 113 | 25 | 145 | 44 | 35 | 32 | 111 | 26 | 190 | 20 | 236 | 553 |
| Total Volume | 74 | 115 | 30 | 219 | 19 | 477 | 90 | 586 | 196 | 125 | 154 | 475 | 94 | 755 | 62 | 911 | 2191 |
| % App. Total | 33.8 | 52.5 | 13.7 | | 3.2 | 81.4 | 15.4 | | 41.3 | 26.3 | 32.4 | | 10.3 | 82.9 | 6.8 | | |
| PHF | .740 | .737 | .682 | .805 | .679 | .924 | .900 | .951 | .766 | .893 | .837 | .825 | .810 | .939 | .775 | .926 | .949 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : alvarado-marina-s
Site Code : 12
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | ALVARADO ST Southbound | | | | MARINA BLVD Westbound | | | | ALVARADO ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|---------------------------|------------|------------|------------|--------------------------|-------------|------------|-------------|---------------------------|------------|------------|-------------|--------------------------|-------------|------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 16 | 14 | 6 | 36 | 4 | 110 | 10 | 124 | 19 | 21 | 17 | 57 | 15 | 89 | 14 | 118 | 335 |
| 10:15 | 23 | 11 | 2 | 36 | 2 | 111 | 6 | 119 | 14 | 11 | 22 | 47 | 8 | 110 | 29 | 147 | 349 |
| 10:30 | 13 | 11 | 4 | 28 | 2 | 119 | 10 | 131 | 22 | 25 | 27 | 74 | 19 | 130 | 21 | 170 | 403 |
| 10:45 | 21 | 19 | 8 | 48 | 6 | 97 | 11 | 114 | 24 | 27 | 23 | 74 | 16 | 118 | 26 | 160 | 396 |
| Total | 73 | 55 | 20 | 148 | 14 | 437 | 37 | 488 | 79 | 84 | 89 | 252 | 58 | 447 | 90 | 595 | 1483 |
| 11:00 | 27 | 20 | 7 | 54 | 13 | 127 | 11 | 151 | 25 | 25 | 34 | 84 | 13 | 121 | 20 | 154 | 443 |
| 11:15 | 26 | 12 | 9 | 47 | 1 | 108 | 15 | 124 | 17 | 21 | 27 | 65 | 17 | 118 | 32 | 167 | 403 |
| 11:30 | 19 | 17 | 11 | 47 | 4 | 120 | 11 | 135 | 32 | 27 | 20 | 79 | 24 | 141 | 24 | 189 | 450 |
| 11:45 | 27 | 19 | 5 | 51 | 9 | 123 | 12 | 144 | 22 | 29 | 37 | 88 | 22 | 148 | 29 | 199 | 482 |
| Total | 99 | 68 | 32 | 199 | 27 | 478 | 49 | 554 | 96 | 102 | 118 | 316 | 76 | 528 | 105 | 709 | 1778 |
| 12:00 | 18 | 18 | 4 | 40 | 3 | 127 | 11 | 141 | 16 | 20 | 33 | 69 | 17 | 126 | 24 | 167 | 417 |
| 12:15 | 30 | 15 | 8 | 53 | 5 | 136 | 20 | 161 | 31 | 20 | 28 | 79 | 22 | 168 | 28 | 218 | 511 |
| 12:30 | 30 | 10 | 8 | 48 | 4 | 141 | 19 | 164 | 18 | 30 | 22 | 70 | 21 | 153 | 17 | 191 | 473 |
| 12:45 | 23 | 22 | 9 | 54 | 6 | 111 | 11 | 128 | 19 | 32 | 26 | 77 | 14 | 172 | 24 | 210 | 469 |
| Total | 101 | 65 | 29 | 195 | 18 | 515 | 61 | 594 | 84 | 102 | 109 | 295 | 74 | 619 | 93 | 786 | 1870 |
| 13:00 | 36 | 14 | 8 | 58 | 7 | 125 | 14 | 146 | 31 | 31 | 35 | 97 | 12 | 146 | 27 | 185 | 486 |
| 13:15 | 33 | 18 | 8 | 59 | 9 | 148 | 5 | 162 | 27 | 22 | 25 | 74 | 21 | 156 | 13 | 190 | 485 |
| 13:30 | 26 | 28 | 11 | 65 | 5 | 141 | 11 | 157 | 23 | 22 | 30 | 75 | 12 | 156 | 26 | 194 | 491 |
| 13:45 | 29 | 19 | 10 | 58 | 3 | 148 | 15 | 166 | 23 | 21 | 25 | 69 | 28 | 142 | 33 | 203 | 496 |
| Total | 124 | 79 | 37 | 240 | 24 | 562 | 45 | 631 | 104 | 96 | 115 | 315 | 73 | 600 | 99 | 772 | 1958 |
| Grand Total | 397 | 267 | 118 | 782 | 83 | 1992 | 192 | 2267 | 363 | 384 | 431 | 1178 | 281 | 2194 | 387 | 2862 | 7089 |
| Apprch % | 50.8 | 34.1 | 15.1 | | 3.7 | 87.9 | 8.5 | | 30.8 | 32.6 | 36.6 | | 9.8 | 76.7 | 13.5 | | |
| Total % | 5.6 | 3.8 | 1.7 | 11 | 1.2 | 28.1 | 2.7 | 32 | 5.1 | 5.4 | 6.1 | 16.6 | 4 | 30.9 | 5.5 | 40.4 | |

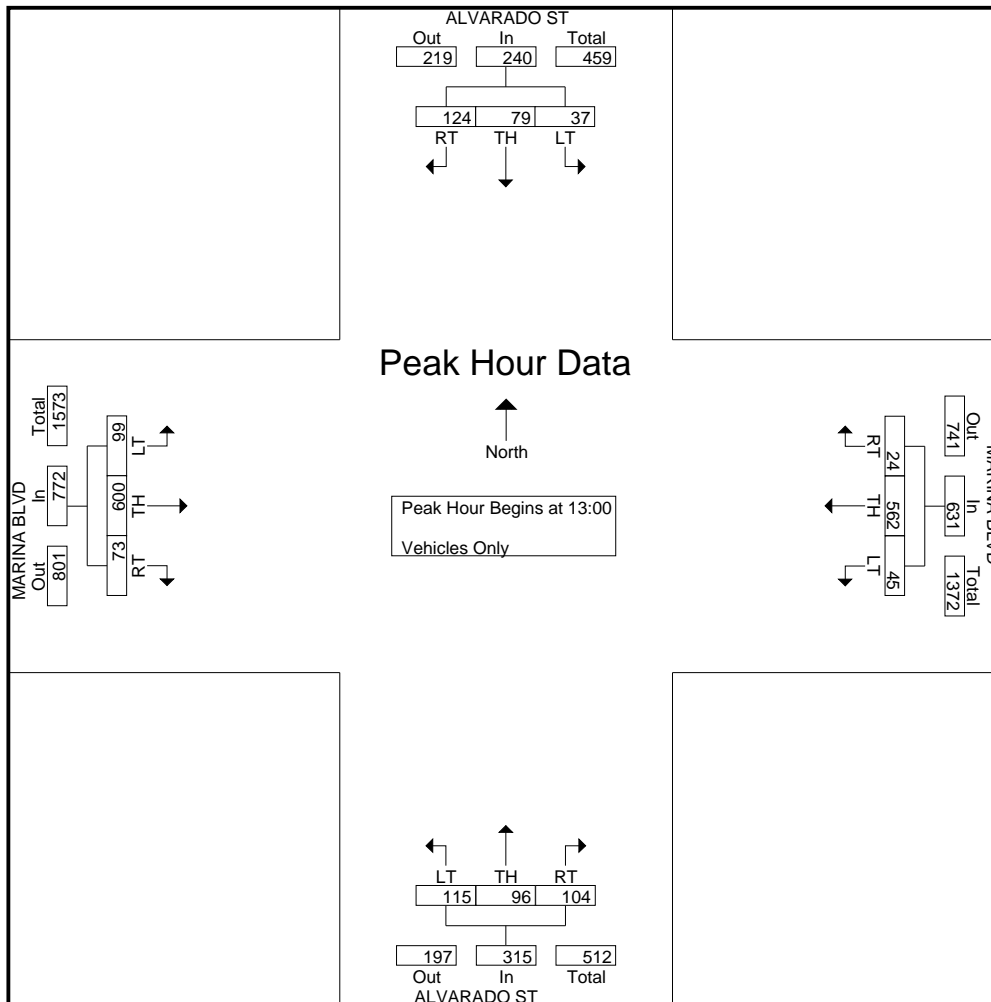
| Start Time | ALVARADO ST Southbound | | | | MARINA BLVD Westbound | | | | ALVARADO ST Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--|---------------------------|-----------|-----------|------------|--------------------------|------------|-----------|------------|---------------------------|-----------|-----------|------------|--------------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 13:00 | | | | | | | | | | | | | | | | | |
| 13:00 | 36 | 14 | 8 | 58 | 7 | 125 | 14 | 146 | 31 | 31 | 35 | 97 | 12 | 146 | 27 | 185 | 486 |
| 13:15 | 33 | 18 | 8 | 59 | 9 | 148 | 5 | 162 | 27 | 22 | 25 | 74 | 21 | 156 | 13 | 190 | 485 |
| 13:30 | 26 | 28 | 11 | 65 | 5 | 141 | 11 | 157 | 23 | 22 | 30 | 75 | 12 | 156 | 26 | 194 | 491 |
| 13:45 | 29 | 19 | 10 | 58 | 3 | 148 | 15 | 166 | 23 | 21 | 25 | 69 | 28 | 142 | 33 | 203 | 496 |
| Total Volume | 124 | 79 | 37 | 240 | 24 | 562 | 45 | 631 | 104 | 96 | 115 | 315 | 73 | 600 | 99 | 772 | 1958 |
| % App. Total | 51.7 | 32.9 | 15.4 | | 3.8 | 89.1 | 7.1 | | 33 | 30.5 | 36.5 | | 9.5 | 77.7 | 12.8 | | |
| PHF | .861 | .705 | .841 | .923 | .667 | .949 | .750 | .950 | .839 | .774 | .821 | .812 | .652 | .962 | .750 | .951 | .987 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : alvarado-marina-s
Site Code : 12
Start Date : 2/2/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

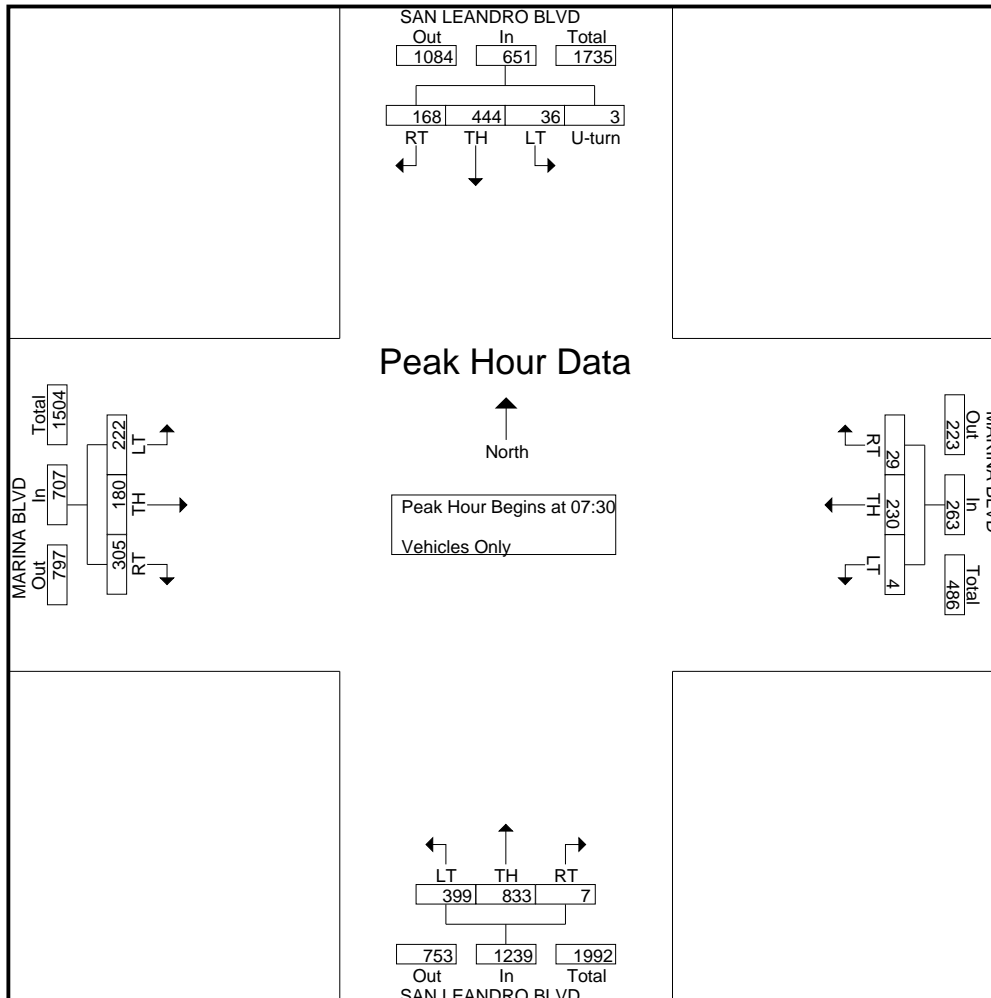
File Name : san leandro-marina-a
Site Code : 22
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | SAN LEANDRO BLVD Southbound | | | | | MARINA BLVD Westbound | | | | SAN LEANDRO BLVD Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|--------------------------------|------------|-----------|----------|-------------|--------------------------|------------|----------|------------|--------------------------------|-------------|------------|-------------|--------------------------|------------|------------|-------------|-------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 27 | 25 | 3 | 0 | 55 | 7 | 34 | 1 | 42 | 1 | 66 | 41 | 108 | 24 | 14 | 38 | 76 | 281 |
| 07:15 | 28 | 46 | 1 | 0 | 75 | 7 | 43 | 1 | 51 | 3 | 103 | 66 | 172 | 34 | 19 | 35 | 88 | 386 |
| 07:30 | 33 | 85 | 6 | 1 | 125 | 9 | 52 | 0 | 61 | 1 | 124 | 90 | 215 | 66 | 36 | 44 | 146 | 547 |
| 07:45 | 51 | 142 | 7 | 0 | 200 | 4 | 72 | 2 | 78 | 3 | 210 | 104 | 317 | 98 | 51 | 66 | 215 | 810 |
| Total | 139 | 298 | 17 | 1 | 455 | 27 | 201 | 4 | 232 | 8 | 503 | 301 | 812 | 222 | 120 | 183 | 525 | 2024 |
| 08:00 | 41 | 129 | 7 | 1 | 178 | 11 | 62 | 1 | 74 | 0 | 263 | 93 | 356 | 88 | 47 | 46 | 181 | 789 |
| 08:15 | 43 | 88 | 16 | 1 | 148 | 5 | 44 | 1 | 50 | 3 | 236 | 112 | 351 | 53 | 46 | 66 | 165 | 714 |
| 08:30 | 38 | 61 | 7 | 0 | 106 | 4 | 47 | 2 | 53 | 2 | 137 | 69 | 208 | 47 | 37 | 48 | 132 | 499 |
| 08:45 | 45 | 61 | 9 | 1 | 116 | 8 | 55 | 0 | 63 | 1 | 79 | 39 | 119 | 41 | 43 | 77 | 161 | 459 |
| Total | 167 | 339 | 39 | 3 | 548 | 28 | 208 | 4 | 240 | 6 | 715 | 313 | 1034 | 229 | 173 | 237 | 639 | 2461 |
| Grand Total | 306 | 637 | 56 | 4 | 1003 | 55 | 409 | 8 | 472 | 14 | 1218 | 614 | 1846 | 451 | 293 | 420 | 1164 | 4485 |
| Apprch % | 30.5 | 63.5 | 5.6 | 0.4 | | 11.7 | 86.7 | 1.7 | | 0.8 | 66 | 33.3 | | 38.7 | 25.2 | 36.1 | | |
| Total % | 6.8 | 14.2 | 1.2 | 0.1 | 22.4 | 1.2 | 9.1 | 0.2 | 10.5 | 0.3 | 27.2 | 13.7 | 41.2 | 10.1 | 6.5 | 9.4 | | 26 |

| Start Time | SAN LEANDRO BLVD Southbound | | | | | MARINA BLVD Westbound | | | | SAN LEANDRO BLVD Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|---------------------|--------------------------------|------------|------|--------|------------|--------------------------|-----------|------|------------|--------------------------------|------|------|------------|--------------------------|-----------|-----------|------------|------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 33 | 85 | 6 | 1 | 125 | 9 | 52 | 0 | 61 | 1 | 124 | 90 | 215 | 66 | 36 | 44 | 146 | 547 |
| 07:45 | 51 | 142 | 7 | 0 | 200 | 4 | 72 | 2 | 78 | 3 | 210 | 104 | 317 | 98 | 51 | 66 | 215 | 810 |
| 08:00 | 41 | 129 | 7 | 1 | 178 | 11 | 62 | 1 | 74 | 0 | 263 | 93 | 356 | 88 | 47 | 46 | 181 | 789 |
| 08:15 | 43 | 88 | 16 | 1 | 148 | 5 | 44 | 1 | 50 | 3 | 236 | 112 | 351 | 53 | 46 | 66 | 165 | 714 |
| Total Volume | 168 | 444 | 36 | 3 | 651 | 29 | 230 | 4 | 263 | 7 | 833 | 399 | 1239 | 305 | 180 | 222 | 707 | 2860 |
| % App. Total | 25.8 | 68.2 | 5.5 | 0.5 | | 11 | 87.5 | 1.5 | | 0.6 | 67.2 | 32.2 | | 43.1 | 25.5 | 31.4 | | |
| PHF | .824 | .782 | .563 | .750 | .814 | .659 | .799 | .500 | .843 | .583 | .792 | .891 | .870 | .778 | .882 | .841 | .822 | .883 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

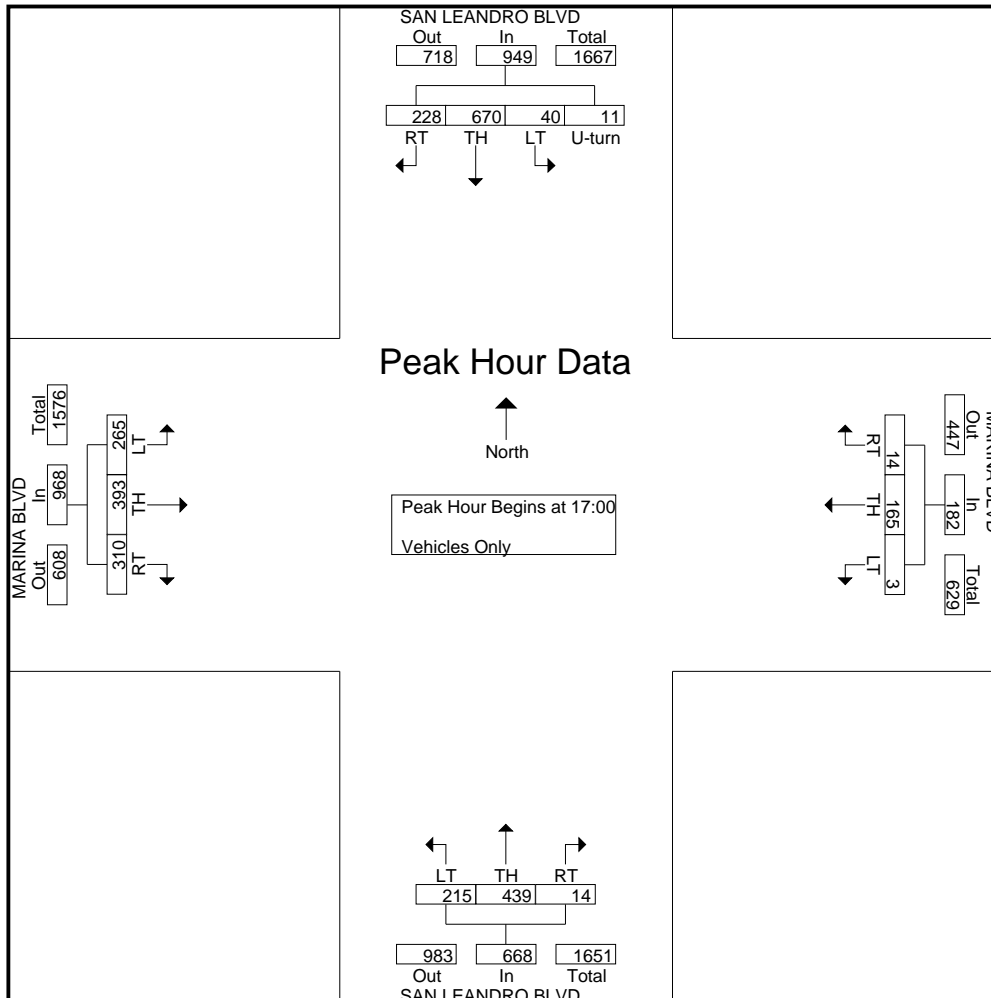
File Name : san leandro-marina-p
Site Code : 22
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | SAN LEANDRO BLVD Southbound | | | | | MARINA BLVD Westbound | | | | SAN LEANDRO BLVD Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|--------------------------------|-------------|-----------|-----------|-------------|--------------------------|------------|----------|------------|--------------------------------|------------|------------|-------------|--------------------------|------------|------------|-------------|-------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 36 | 102 | 4 | 2 | 144 | 4 | 38 | 1 | 43 | 4 | 74 | 40 | 118 | 79 | 82 | 60 | 221 | 526 |
| 16:15 | 40 | 117 | 9 | 0 | 166 | 8 | 45 | 1 | 54 | 3 | 92 | 48 | 143 | 65 | 83 | 56 | 204 | 567 |
| 16:30 | 52 | 122 | 7 | 4 | 185 | 6 | 28 | 1 | 35 | 3 | 92 | 60 | 155 | 79 | 91 | 64 | 234 | 609 |
| 16:45 | 39 | 136 | 10 | 3 | 188 | 5 | 54 | 0 | 59 | 3 | 90 | 57 | 150 | 87 | 79 | 54 | 220 | 617 |
| Total | 167 | 477 | 30 | 9 | 683 | 23 | 165 | 3 | 191 | 13 | 348 | 205 | 566 | 310 | 335 | 234 | 879 | 2319 |
| 17:00 | 65 | 148 | 12 | 6 | 231 | 3 | 45 | 0 | 48 | 2 | 120 | 70 | 192 | 85 | 108 | 74 | 267 | 738 |
| 17:15 | 51 | 179 | 9 | 1 | 240 | 3 | 30 | 1 | 34 | 4 | 113 | 53 | 170 | 91 | 96 | 75 | 262 | 706 |
| 17:30 | 57 | 148 | 9 | 3 | 217 | 6 | 33 | 1 | 40 | 5 | 109 | 44 | 158 | 73 | 107 | 66 | 246 | 661 |
| 17:45 | 55 | 195 | 10 | 1 | 261 | 2 | 57 | 1 | 60 | 3 | 97 | 48 | 148 | 61 | 82 | 50 | 193 | 662 |
| Total | 228 | 670 | 40 | 11 | 949 | 14 | 165 | 3 | 182 | 14 | 439 | 215 | 668 | 310 | 393 | 265 | 968 | 2767 |
| Grand Total | 395 | 1147 | 70 | 20 | 1632 | 37 | 330 | 6 | 373 | 27 | 787 | 420 | 1234 | 620 | 728 | 499 | 1847 | 5086 |
| Apprch % | 24.2 | 70.3 | 4.3 | 1.2 | | 9.9 | 88.5 | 1.6 | | 2.2 | 63.8 | 34 | | 33.6 | 39.4 | 27 | | |
| Total % | 7.8 | 22.6 | 1.4 | 0.4 | 32.1 | 0.7 | 6.5 | 0.1 | 7.3 | 0.5 | 15.5 | 8.3 | 24.3 | 12.2 | 14.3 | 9.8 | 36.3 | |

| Start Time | SAN LEANDRO BLVD Southbound | | | | | MARINA BLVD Westbound | | | | SAN LEANDRO BLVD Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|---------------------|--------------------------------|------------|-----------|-----------|------------|--------------------------|------------|----------|------------|--------------------------------|------------|------------|------------|--------------------------|------------|------------|------------|-------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 17:00 | 65 | 148 | 12 | 6 | 231 | 3 | 45 | 0 | 48 | 2 | 120 | 70 | 192 | 85 | 108 | 74 | 267 | 738 |
| 17:15 | 51 | 179 | 9 | 1 | 240 | 3 | 30 | 1 | 34 | 4 | 113 | 53 | 170 | 91 | 96 | 75 | 262 | 706 |
| 17:30 | 57 | 148 | 9 | 3 | 217 | 6 | 33 | 1 | 40 | 5 | 109 | 44 | 158 | 73 | 107 | 66 | 246 | 661 |
| 17:45 | 55 | 195 | 10 | 1 | 261 | 2 | 57 | 1 | 60 | 3 | 97 | 48 | 148 | 61 | 82 | 50 | 193 | 662 |
| Total Volume | 228 | 670 | 40 | 11 | 949 | 14 | 165 | 3 | 182 | 14 | 439 | 215 | 668 | 310 | 393 | 265 | 968 | 2767 |
| % App. Total | 24 | 70.6 | 4.2 | 1.2 | | 7.7 | 90.7 | 1.6 | | 2.1 | 65.7 | 32.2 | | 32 | 40.6 | 27.4 | | |
| PHF | .877 | .859 | .833 | .458 | .909 | .583 | .724 | .750 | .758 | .700 | .915 | .768 | .870 | .852 | .910 | .883 | .906 | .937 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 17:00



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : san leandro-marina-s
Site Code : 22
Start Date : 1/26/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | SAN LEANDRO BLVD Southbound | | | | | MARINA BLVD Westbound | | | | SAN LEANDRO BLVD Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--------------------|--------------------------------|-------------|-----------|-----------|-------------|--------------------------|------------|-----------|------------|--------------------------------|-------------|------------|-------------|--------------------------|------------|------------|-------------|-------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 36 | 76 | 8 | 1 | 121 | 1 | 38 | 2 | 41 | 0 | 65 | 50 | 115 | 36 | 37 | 31 | 104 | 381 |
| 10:15 | 42 | 79 | 2 | 4 | 127 | 4 | 48 | 1 | 53 | 3 | 65 | 46 | 114 | 49 | 38 | 30 | 117 | 411 |
| 10:30 | 28 | 55 | 4 | 0 | 87 | 4 | 37 | 2 | 43 | 0 | 49 | 38 | 87 | 37 | 46 | 28 | 111 | 328 |
| 10:45 | 31 | 72 | 7 | 2 | 112 | 2 | 45 | 1 | 48 | 1 | 59 | 47 | 107 | 65 | 47 | 37 | 149 | 416 |
| Total | 137 | 282 | 21 | 7 | 447 | 11 | 168 | 6 | 185 | 4 | 238 | 181 | 423 | 187 | 168 | 126 | 481 | 1536 |
| 11:00 | 44 | 69 | 4 | 4 | 121 | 6 | 43 | 1 | 50 | 4 | 65 | 41 | 110 | 37 | 51 | 36 | 124 | 405 |
| 11:15 | 50 | 69 | 1 | 2 | 122 | 3 | 38 | 1 | 42 | 1 | 70 | 56 | 127 | 41 | 49 | 33 | 123 | 414 |
| 11:30 | 38 | 86 | 7 | 2 | 133 | 4 | 50 | 1 | 55 | 1 | 77 | 48 | 126 | 58 | 52 | 44 | 154 | 468 |
| 11:45 | 32 | 86 | 9 | 0 | 127 | 4 | 35 | 0 | 39 | 4 | 56 | 53 | 113 | 64 | 58 | 39 | 161 | 440 |
| Total | 164 | 310 | 21 | 8 | 503 | 17 | 166 | 3 | 186 | 10 | 268 | 198 | 476 | 200 | 210 | 152 | 562 | 1727 |
| 12:00 | 35 | 93 | 8 | 0 | 136 | 1 | 56 | 2 | 59 | 5 | 82 | 52 | 139 | 50 | 51 | 44 | 145 | 479 |
| 12:15 | 40 | 91 | 15 | 1 | 147 | 6 | 43 | 1 | 50 | 1 | 73 | 58 | 132 | 54 | 61 | 38 | 153 | 482 |
| 12:30 | 45 | 80 | 4 | 0 | 129 | 6 | 58 | 2 | 66 | 3 | 65 | 63 | 131 | 55 | 56 | 52 | 163 | 489 |
| 12:45 | 34 | 88 | 5 | 2 | 129 | 7 | 37 | 0 | 44 | 3 | 102 | 42 | 147 | 63 | 64 | 43 | 170 | 490 |
| Total | 154 | 352 | 32 | 3 | 541 | 20 | 194 | 5 | 219 | 12 | 322 | 215 | 549 | 222 | 232 | 177 | 631 | 1940 |
| 13:00 | 52 | 98 | 7 | 2 | 159 | 6 | 61 | 1 | 68 | 4 | 88 | 49 | 141 | 63 | 55 | 49 | 167 | 535 |
| 13:15 | 37 | 82 | 6 | 2 | 127 | 6 | 53 | 1 | 60 | 0 | 80 | 47 | 127 | 63 | 75 | 34 | 172 | 486 |
| 13:30 | 50 | 70 | 4 | 1 | 125 | 2 | 61 | 1 | 64 | 4 | 85 | 41 | 130 | 45 | 59 | 50 | 154 | 473 |
| 13:45 | 57 | 80 | 5 | 2 | 144 | 2 | 34 | 0 | 36 | 1 | 109 | 70 | 180 | 69 | 71 | 45 | 185 | 545 |
| Total | 196 | 330 | 22 | 7 | 555 | 16 | 209 | 3 | 228 | 9 | 362 | 207 | 578 | 240 | 260 | 178 | 678 | 2039 |
| Grand Total | 651 | 1274 | 96 | 25 | 2046 | 64 | 737 | 17 | 818 | 35 | 1190 | 801 | 2026 | 849 | 870 | 633 | 2352 | 7242 |
| Apprch % | 31.8 | 62.3 | 4.7 | 1.2 | | 7.8 | 90.1 | 2.1 | | 1.7 | 58.7 | 39.5 | | 36.1 | 37 | 26.9 | | |
| Total % | 9 | 17.6 | 1.3 | 0.3 | 28.3 | 0.9 | 10.2 | 0.2 | 11.3 | 0.5 | 16.4 | 11.1 | 28 | 11.7 | 12 | 8.7 | 32.5 | |

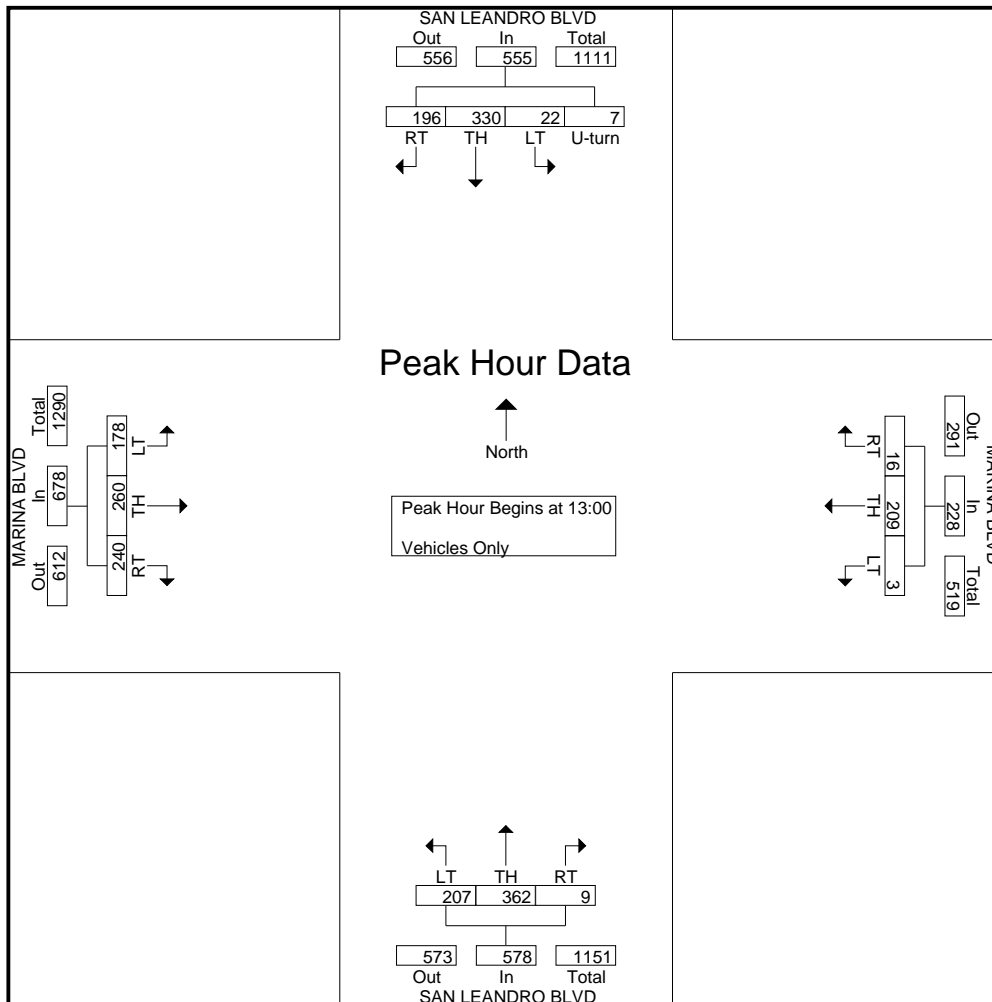
| Start Time | SAN LEANDRO BLVD Southbound | | | | | MARINA BLVD Westbound | | | | SAN LEANDRO BLVD Northbound | | | | MARINA BLVD Eastbound | | | | Int. Total |
|--|--------------------------------|-------------|-------------|-------------|-------------|--------------------------|-------------|-------------|-------------|--------------------------------|-------------|-------------|-------------|--------------------------|-------------|-------------|-------------|-------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 13:00 | | | | | | | | | | | | | | | | | | |
| 13:00 | 52 | 98 | 7 | 2 | 159 | 6 | 61 | 1 | 68 | 4 | 88 | 49 | 141 | 63 | 55 | 49 | 167 | 535 |
| 13:15 | 37 | 82 | 6 | 2 | 127 | 6 | 53 | 1 | 60 | 0 | 80 | 47 | 127 | 63 | 75 | 34 | 172 | 486 |
| 13:30 | 50 | 70 | 4 | 1 | 125 | 2 | 61 | 1 | 64 | 4 | 85 | 41 | 130 | 45 | 59 | 50 | 154 | 473 |
| 13:45 | 57 | 80 | 5 | 2 | 144 | 2 | 34 | 0 | 36 | 1 | 109 | 70 | 180 | 69 | 71 | 45 | 185 | 545 |
| Total Volume | 196 | 330 | 22 | 7 | 555 | 16 | 209 | 3 | 228 | 9 | 362 | 207 | 578 | 240 | 260 | 178 | 678 | 2039 |
| % App. Total | 35.3 | 59.5 | 4 | 1.3 | | 7 | 91.7 | 1.3 | | 1.6 | 62.6 | 35.8 | | 35.4 | 38.3 | 26.3 | | |
| PHF | .860 | .842 | .786 | .875 | .873 | .667 | .857 | .750 | .838 | .563 | .830 | .739 | .803 | .870 | .867 | .890 | .916 | .935 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : san leandro-marina-s
Site Code : 22
Start Date : 1/26/2013
Page No : 2



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

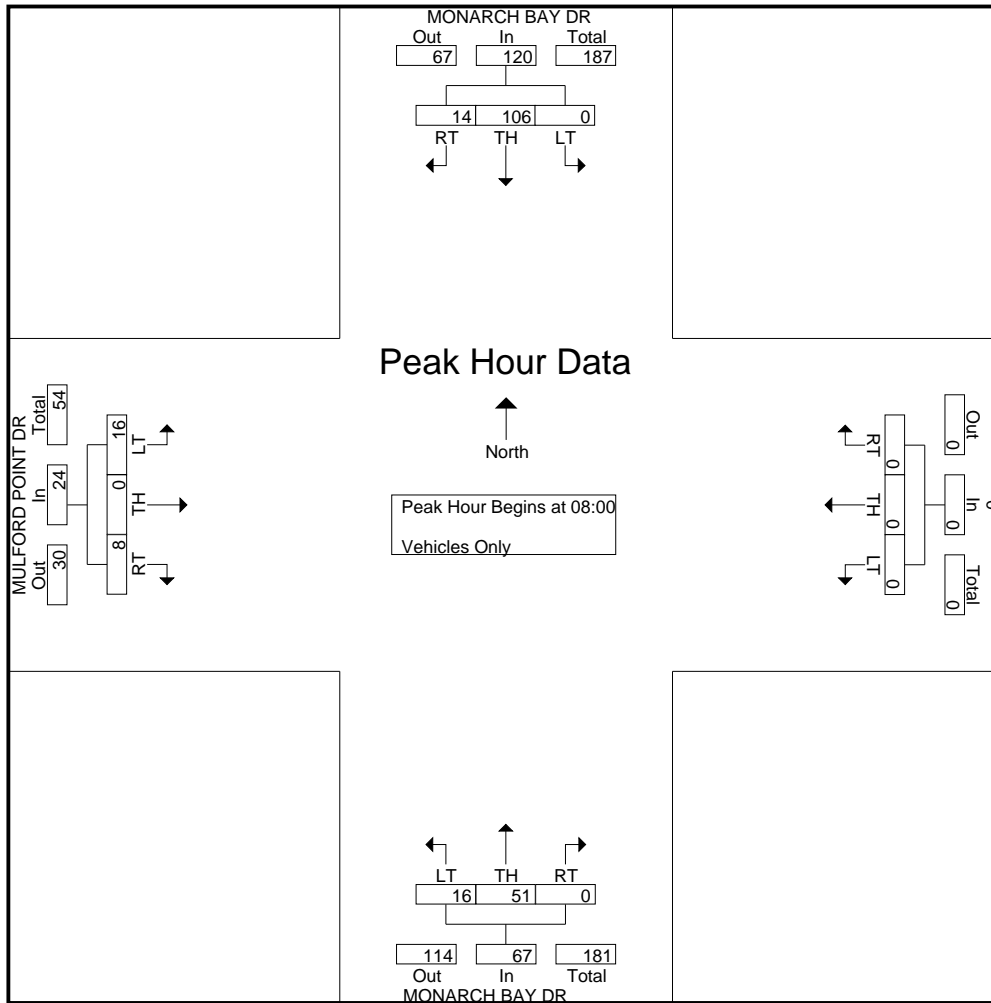
File Name : monarch-mulford-a
Site Code : 28
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | MULFORD POINT DR Eastbound | | | | Int. Total |
|--------------------|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|-----------|-----------|------------|-------------------------------|----------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 2 | 8 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 9 | 4 | 13 | 2 | 0 | 4 | 6 | 29 |
| 07:15 | 2 | 16 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 10 | 1 | 11 | 3 | 0 | 5 | 8 | 37 |
| 07:30 | 5 | 11 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 8 | 3 | 11 | 1 | 0 | 1 | 2 | 29 |
| 07:45 | 4 | 24 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 14 | 1 | 15 | 1 | 0 | 5 | 6 | 49 |
| Total | 13 | 59 | 0 | 72 | 0 | 0 | 0 | 0 | 0 | 41 | 9 | 50 | 7 | 0 | 15 | 22 | 144 |
| 08:00 | 2 | 18 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 12 | 4 | 16 | 3 | 0 | 3 | 6 | 42 |
| 08:15 | 3 | 32 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 9 | 4 | 13 | 2 | 0 | 3 | 5 | 53 |
| 08:30 | 3 | 23 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 16 | 3 | 19 | 1 | 0 | 7 | 8 | 53 |
| 08:45 | 6 | 33 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 14 | 5 | 19 | 2 | 0 | 3 | 5 | 63 |
| Total | 14 | 106 | 0 | 120 | 0 | 0 | 0 | 0 | 0 | 51 | 16 | 67 | 8 | 0 | 16 | 24 | 211 |
| Grand Total | 27 | 165 | 0 | 192 | 0 | 0 | 0 | 0 | 0 | 92 | 25 | 117 | 15 | 0 | 31 | 46 | 355 |
| Apprch % | 14.1 | 85.9 | 0 | | 0 | 0 | 0 | | 0 | 78.6 | 21.4 | | 32.6 | 0 | 67.4 | | |
| Total % | 7.6 | 46.5 | 0 | 54.1 | 0 | 0 | 0 | 0 | 0 | 25.9 | 7 | 33 | 4.2 | 0 | 8.7 | 13 | |

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | MULFORD POINT DR Eastbound | | | | Int. Total |
|---------------------|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|-----------|-----------|------------|-------------------------------|----------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 08:00 | 2 | 18 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 12 | 4 | 16 | 3 | 0 | 3 | 6 | 42 |
| 08:15 | 3 | 32 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 9 | 4 | 13 | 2 | 0 | 3 | 5 | 53 |
| 08:30 | 3 | 23 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 16 | 3 | 19 | 1 | 0 | 7 | 8 | 53 |
| 08:45 | 6 | 33 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 14 | 5 | 19 | 2 | 0 | 3 | 5 | 63 |
| Total Volume | 14 | 106 | 0 | 120 | 0 | 0 | 0 | 0 | 0 | 51 | 16 | 67 | 8 | 0 | 16 | 24 | 211 |
| % App. Total | 11.7 | 88.3 | 0 | | 0 | 0 | 0 | | 0 | 76.1 | 23.9 | | 33.3 | 0 | 66.7 | | |
| PHF | .583 | .803 | .000 | .769 | .000 | .000 | .000 | .000 | .000 | .797 | .800 | .882 | .667 | .000 | .571 | .750 | .837 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 08:00



MARKS TRAFFIC DATA

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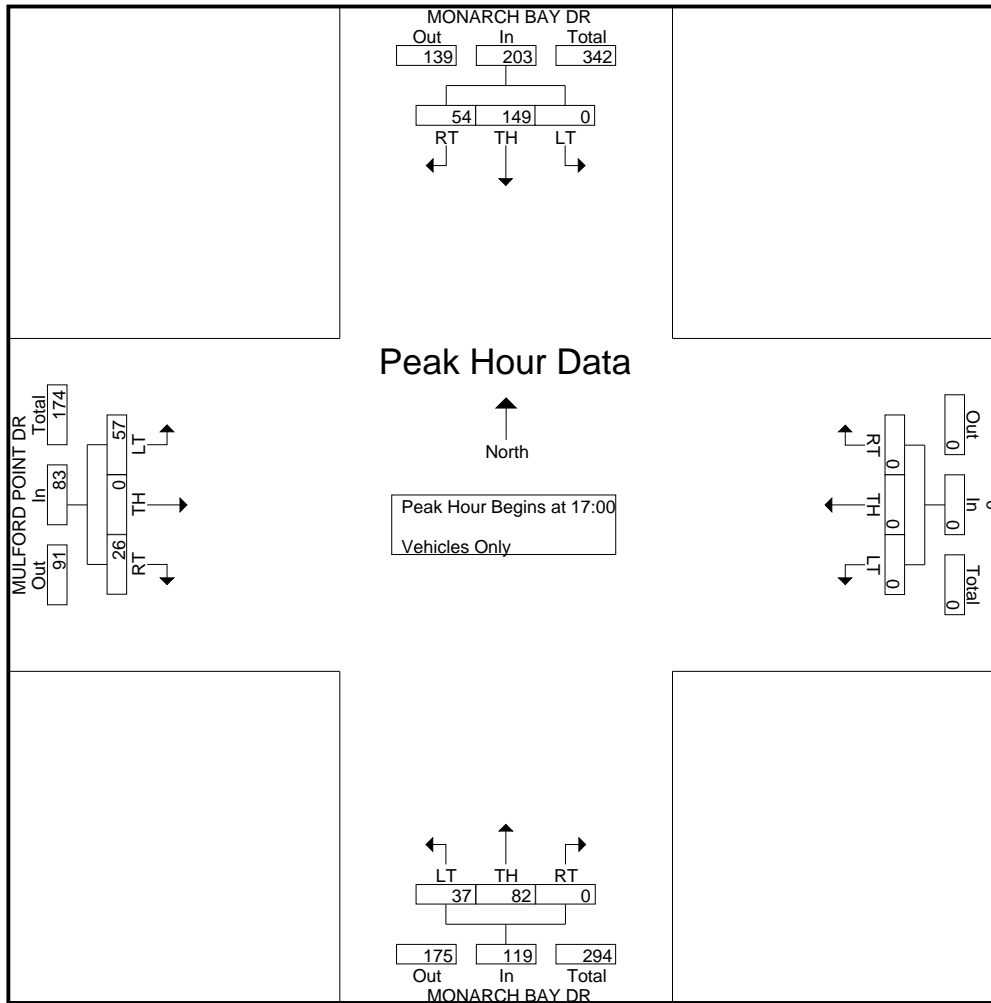
CITY OF SAN LEANDRO
Shoreline EIR

File Name : monarch-mulford-p
Site Code : 28
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | MULFORD POINT DR Eastbound | | | | Int. Total |
|--------------|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|-----------|-----------|------------|-------------------------------|----------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 10 | 31 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 24 | 4 | 28 | 6 | 0 | 15 | 21 | 90 |
| 16:15 | 19 | 28 | 0 | 47 | 0 | 0 | 0 | 0 | 0 | 17 | 5 | 22 | 5 | 0 | 6 | 11 | 80 |
| 16:30 | 13 | 28 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 22 | 3 | 25 | 6 | 0 | 10 | 16 | 82 |
| 16:45 | 14 | 29 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 21 | 5 | 26 | 2 | 0 | 9 | 11 | 80 |
| Total | 56 | 116 | 0 | 172 | 0 | 0 | 0 | 0 | 0 | 84 | 17 | 101 | 19 | 0 | 40 | 59 | 332 |
| 17:00 | 8 | 32 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 20 | 14 | 34 | 6 | 0 | 17 | 23 | 97 |
| 17:15 | 13 | 46 | 0 | 59 | 0 | 0 | 0 | 0 | 0 | 26 | 8 | 34 | 8 | 0 | 15 | 23 | 116 |
| 17:30 | 15 | 40 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 21 | 9 | 30 | 4 | 0 | 10 | 14 | 99 |
| 17:45 | 18 | 31 | 0 | 49 | 0 | 0 | 0 | 0 | 0 | 15 | 6 | 21 | 8 | 0 | 15 | 23 | 93 |
| Total | 54 | 149 | 0 | 203 | 0 | 0 | 0 | 0 | 0 | 82 | 37 | 119 | 26 | 0 | 57 | 83 | 405 |
| Grand Total | 110 | 265 | 0 | 375 | 0 | 0 | 0 | 0 | 0 | 166 | 54 | 220 | 45 | 0 | 97 | 142 | 737 |
| Apprch % | 29.3 | 70.7 | 0 | | 0 | 0 | 0 | | 0 | 75.5 | 24.5 | | 31.7 | 0 | 68.3 | | |
| Total % | 14.9 | 36 | 0 | 50.9 | 0 | 0 | 0 | 0 | 0 | 22.5 | 7.3 | 29.9 | 6.1 | 0 | 13.2 | 19.3 | |

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | MULFORD POINT DR Eastbound | | | | Int. Total |
|--|------------------------------|------|------|------------|----------------|------|------|------------|------------------------------|------|------|------------|-------------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 17:00 | | | | | | | | | | | | | | | | | |
| 17:00 | 8 | 32 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 20 | 14 | 34 | 6 | 0 | 17 | 23 | 97 |
| 17:15 | 13 | 46 | 0 | 59 | 0 | 0 | 0 | 0 | 0 | 26 | 8 | 34 | 8 | 0 | 15 | 23 | 116 |
| 17:30 | 15 | 40 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 21 | 9 | 30 | 4 | 0 | 10 | 14 | 99 |
| 17:45 | 18 | 31 | 0 | 49 | 0 | 0 | 0 | 0 | 0 | 15 | 6 | 21 | 8 | 0 | 15 | 23 | 93 |
| Total Volume | 54 | 149 | 0 | 203 | 0 | 0 | 0 | 0 | 0 | 82 | 37 | 119 | 26 | 0 | 57 | 83 | 405 |
| % App. Total | 26.6 | 73.4 | 0 | | 0 | 0 | 0 | | 0 | 68.9 | 31.1 | | 31.3 | 0 | 68.7 | | |
| PHF | .750 | .810 | .000 | .860 | .000 | .000 | .000 | .000 | .000 | .788 | .661 | .875 | .813 | .000 | .838 | .902 | .873 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : monarch-mulford-s
Site Code : 28
Start Date : 5/18/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | MULFORD POINT DR Eastbound | | | | Int. Total |
|--------------------|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|------------|-----------|------------|-------------------------------|----------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 4 | 42 | 0 | 46 | 0 | 0 | 0 | 0 | 0 | 30 | 3 | 33 | 3 | 0 | 9 | 12 | 91 |
| 10:15 | 4 | 36 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 29 | 5 | 34 | 1 | 0 | 3 | 4 | 78 |
| 10:30 | 6 | 47 | 0 | 53 | 0 | 0 | 0 | 0 | 0 | 22 | 2 | 24 | 4 | 0 | 6 | 10 | 87 |
| 10:45 | 14 | 26 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 21 | 3 | 24 | 5 | 0 | 4 | 9 | 73 |
| Total | 28 | 151 | 0 | 179 | 0 | 0 | 0 | 0 | 0 | 102 | 13 | 115 | 13 | 0 | 22 | 35 | 329 |
| 11:00 | 7 | 31 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 37 | 7 | 44 | 4 | 0 | 6 | 10 | 92 |
| 11:15 | 10 | 31 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 21 | 2 | 23 | 3 | 0 | 5 | 8 | 72 |
| 11:30 | 13 | 30 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 29 | 9 | 38 | 5 | 0 | 8 | 13 | 94 |
| 11:45 | 10 | 30 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 25 | 6 | 31 | 8 | 0 | 6 | 14 | 85 |
| Total | 40 | 122 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 112 | 24 | 136 | 20 | 0 | 25 | 45 | 343 |
| 12:00 | 13 | 40 | 0 | 53 | 0 | 0 | 0 | 0 | 0 | 38 | 5 | 43 | 5 | 0 | 11 | 16 | 112 |
| 12:15 | 16 | 36 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 34 | 9 | 43 | 2 | 0 | 13 | 15 | 110 |
| 12:30 | 9 | 24 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 40 | 8 | 48 | 7 | 0 | 9 | 16 | 97 |
| 12:45 | 10 | 29 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 34 | 11 | 45 | 11 | 0 | 12 | 23 | 107 |
| Total | 48 | 129 | 0 | 177 | 0 | 0 | 0 | 0 | 0 | 146 | 33 | 179 | 25 | 0 | 45 | 70 | 426 |
| 13:00 | 12 | 31 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 29 | 4 | 33 | 10 | 0 | 8 | 18 | 94 |
| 13:15 | 11 | 41 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 28 | 7 | 35 | 4 | 0 | 16 | 20 | 107 |
| 13:30 | 11 | 25 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 22 | 2 | 24 | 10 | 0 | 12 | 22 | 82 |
| 13:45 | 12 | 39 | 0 | 51 | 0 | 0 | 0 | 0 | 0 | 28 | 9 | 37 | 8 | 0 | 12 | 20 | 108 |
| Total | 46 | 136 | 0 | 182 | 0 | 0 | 0 | 0 | 0 | 107 | 22 | 129 | 32 | 0 | 48 | 80 | 391 |
| Grand Total | 162 | 538 | 0 | 700 | 0 | 0 | 0 | 0 | 0 | 467 | 92 | 559 | 90 | 0 | 140 | 230 | 1489 |
| Apprch % | 23.1 | 76.9 | 0 | | 0 | 0 | 0 | | 0 | 83.5 | 16.5 | | 39.1 | 0 | 60.9 | | |
| Total % | 10.9 | 36.1 | 0 | 47 | 0 | 0 | 0 | 0 | 0 | 31.4 | 6.2 | 37.5 | 6 | 0 | 9.4 | 15.4 | |

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | MULFORD POINT DR Eastbound | | | | Int. Total |
|---------------------|------------------------------|-----------|------|------------|----------------|------|------|------------|------------------------------|-----------|-----------|------------|-------------------------------|------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 12:00 | 13 | 40 | 0 | 53 | 0 | 0 | 0 | 0 | 0 | 38 | 5 | 43 | 5 | 0 | 11 | 16 | 112 |
| 12:15 | 16 | 36 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 34 | 9 | 43 | 2 | 0 | 13 | 15 | 110 |
| 12:30 | 9 | 24 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 40 | 8 | 48 | 7 | 0 | 9 | 16 | 97 |
| 12:45 | 10 | 29 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 34 | 11 | 45 | 11 | 0 | 12 | 23 | 107 |
| Total Volume | 48 | 129 | 0 | 177 | 0 | 0 | 0 | 0 | 0 | 146 | 33 | 179 | 25 | 0 | 45 | 70 | 426 |
| % App. Total | 27.1 | 72.9 | 0 | | 0 | 0 | 0 | | 0 | 81.6 | 18.4 | | 35.7 | 0 | 64.3 | | |
| PHF | .750 | .806 | .000 | .835 | .000 | .000 | .000 | .000 | .000 | .913 | .750 | .932 | .568 | .000 | .865 | .761 | .951 |

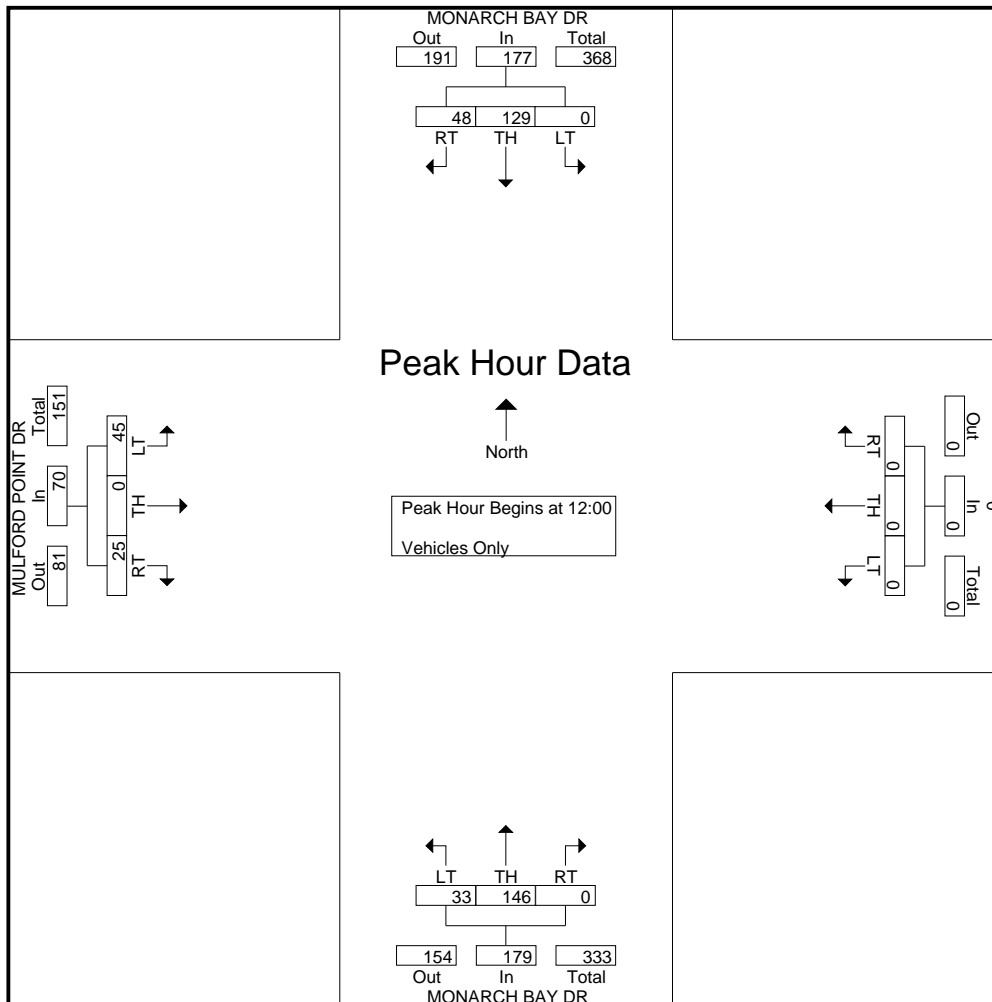
Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 12:00

MARKS TRAFFIC DATA

mietekm@comcast.net
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CITY OF SAN LEANDRO
Shoreline EIR

File Name : monarch-mulford-s
Site Code : 28
Start Date : 5/18/2013
Page No : 2



MARKS TRAFFIC DATA

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916.806.0250

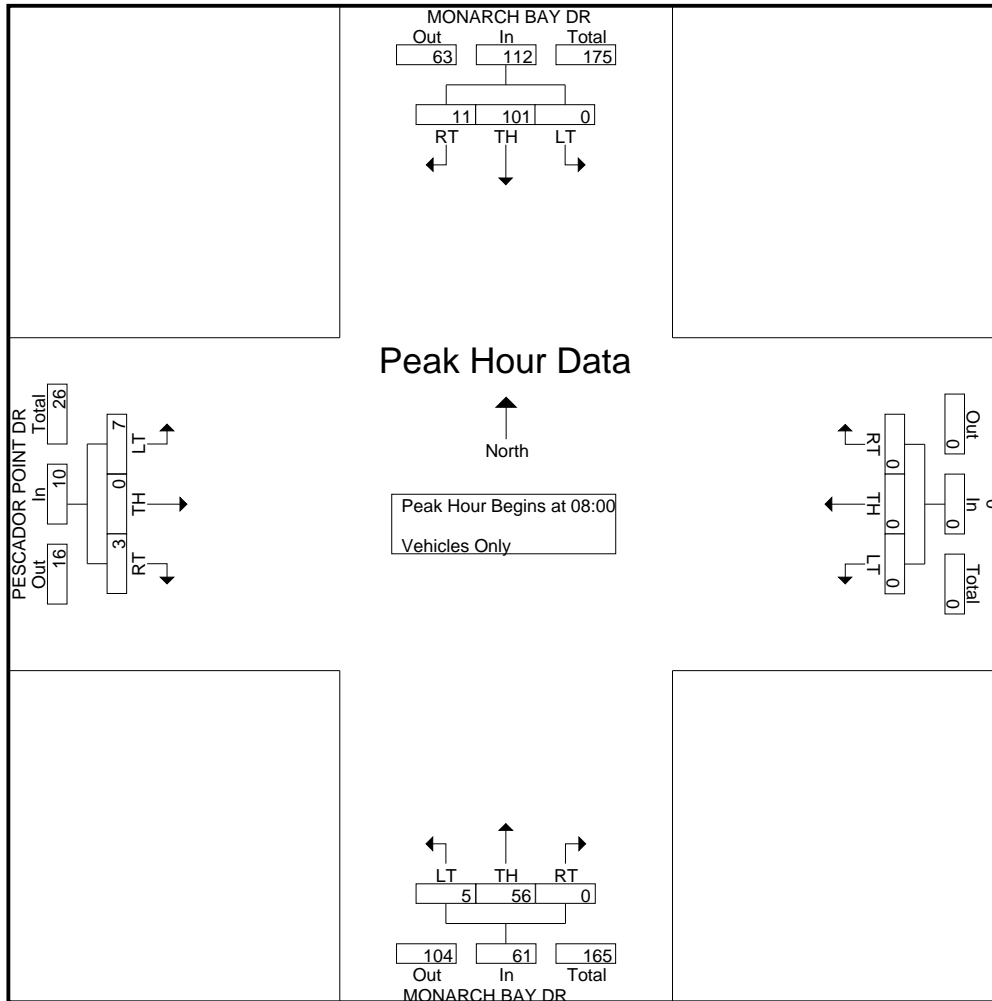
CITY OF SAN LEANDRO
Shoreline EIR

File Name : monarch-pescador-a
Site Code : 29
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | PESCADOR POINT DR Eastbound | | | | Int. Total |
|--------------------|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|-----------|----------|------------|--------------------------------|----------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 1 | 12 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 8 | 2 | 0 | 3 | 5 | 26 |
| 07:15 | 1 | 17 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 0 | 0 | 1 | 1 | 25 |
| 07:30 | 2 | 9 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 1 | 0 | 2 | 3 | 20 |
| 07:45 | 3 | 20 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 7 | 0 | 0 | 4 | 4 | 34 |
| Total | 7 | 58 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 25 | 2 | 27 | 3 | 0 | 10 | 13 | 105 |
| 08:00 | 1 | 19 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 13 | 1 | 14 | 0 | 0 | 0 | 0 | 34 |
| 08:15 | 2 | 28 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 10 | 2 | 12 | 3 | 0 | 2 | 5 | 47 |
| 08:30 | 3 | 23 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 18 | 1 | 19 | 0 | 0 | 1 | 1 | 46 |
| 08:45 | 5 | 31 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 15 | 1 | 16 | 0 | 0 | 4 | 4 | 56 |
| Total | 11 | 101 | 0 | 112 | 0 | 0 | 0 | 0 | 0 | 56 | 5 | 61 | 3 | 0 | 7 | 10 | 183 |
| Grand Total | 18 | 159 | 0 | 177 | 0 | 0 | 0 | 0 | 0 | 81 | 7 | 88 | 6 | 0 | 17 | 23 | 288 |
| Apprch % | 10.2 | 89.8 | 0 | | 0 | 0 | 0 | | 0 | 92 | 8 | | 26.1 | 0 | 73.9 | | |
| Total % | 6.2 | 55.2 | 0 | 61.5 | 0 | 0 | 0 | 0 | 0 | 28.1 | 2.4 | 30.6 | 2.1 | 0 | 5.9 | 8 | |

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | PESCADOR POINT DR Eastbound | | | | Int. Total |
|--|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|-----------|----------|------------|--------------------------------|----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 | | | | | | | | | | | | | | | | | |
| 08:00 | 1 | 19 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 13 | 1 | 14 | 0 | 0 | 0 | 0 | 34 |
| 08:15 | 2 | 28 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 10 | 2 | 12 | 3 | 0 | 2 | 5 | 47 |
| 08:30 | 3 | 23 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 18 | 1 | 19 | 0 | 0 | 1 | 1 | 46 |
| 08:45 | 5 | 31 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 15 | 1 | 16 | 0 | 0 | 4 | 4 | 56 |
| Total Volume | 11 | 101 | 0 | 112 | 0 | 0 | 0 | 0 | 0 | 56 | 5 | 61 | 3 | 0 | 7 | 10 | 183 |
| % App. Total | 9.8 | 90.2 | 0 | | 0 | 0 | 0 | | 0 | 91.8 | 8.2 | | 30 | 0 | 70 | | |
| PHF | .550 | .815 | .000 | .778 | .000 | .000 | .000 | .000 | .000 | .778 | .625 | .803 | .250 | .000 | .438 | .500 | .817 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

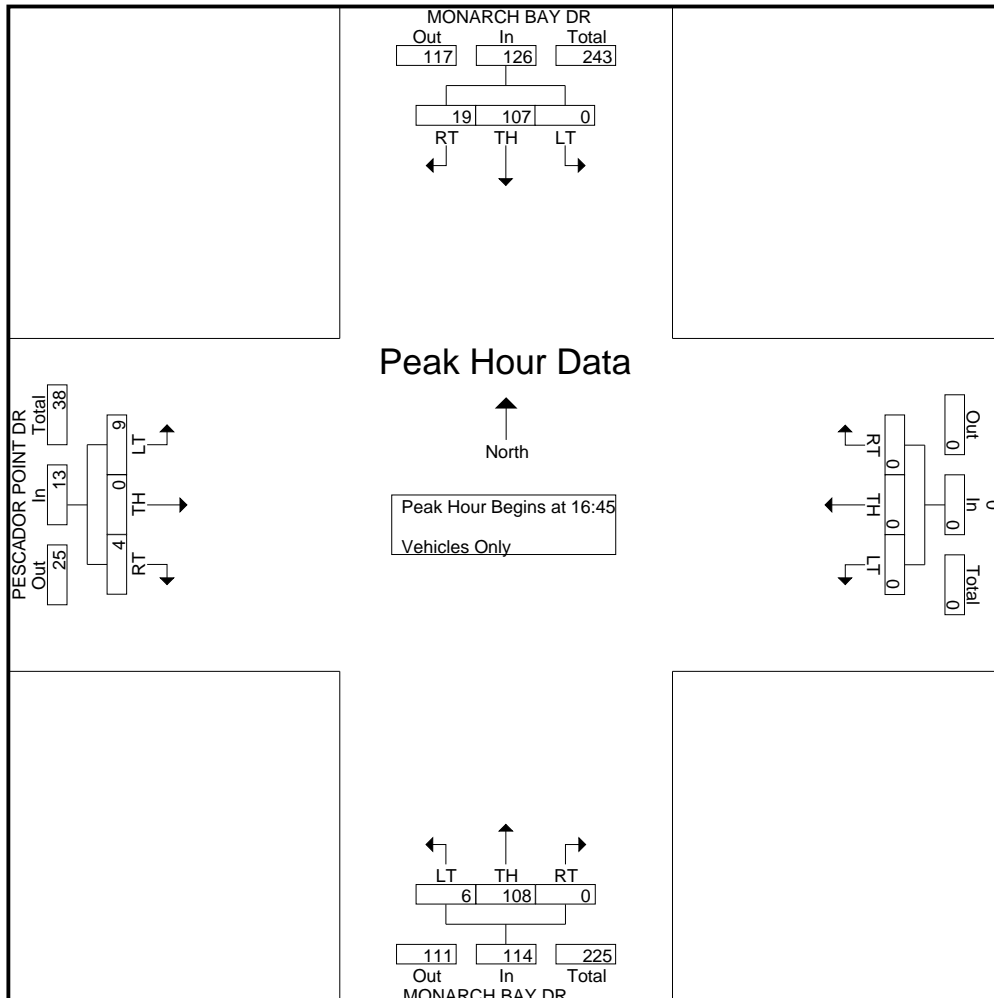
File Name : monarch-pescador-p
Site Code : 29
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | PESCADOR POINT DR Eastbound | | | | Int. Total |
|--------------------|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|------------|-----------|------------|--------------------------------|----------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 8 | 21 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 19 | 1 | 0 | 7 | 8 | 56 |
| 16:15 | 3 | 23 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 16 | 2 | 18 | 3 | 0 | 7 | 10 | 54 |
| 16:30 | 4 | 22 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 19 | 2 | 0 | 5 | 7 | 52 |
| 16:45 | 4 | 22 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 2 | 0 | 3 | 5 | 55 |
| Total | 19 | 88 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 78 | 2 | 80 | 8 | 0 | 22 | 30 | 217 |
| 17:00 | 8 | 25 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 36 | 2 | 38 | 1 | 0 | 3 | 4 | 75 |
| 17:15 | 3 | 28 | 0 | 31 | 0 | 0 | 0 | 0 | 0 | 31 | 3 | 34 | 1 | 0 | 2 | 3 | 68 |
| 17:30 | 4 | 32 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 17 | 1 | 18 | 0 | 0 | 1 | 1 | 55 |
| 17:45 | 4 | 22 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 21 | 4 | 25 | 1 | 0 | 2 | 3 | 54 |
| Total | 19 | 107 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 105 | 10 | 115 | 3 | 0 | 8 | 11 | 252 |
| Grand Total | 38 | 195 | 0 | 233 | 0 | 0 | 0 | 0 | 0 | 183 | 12 | 195 | 11 | 0 | 30 | 41 | 469 |
| Apprch % | 16.3 | 83.7 | 0 | | 0 | 0 | 0 | | 0 | 93.8 | 6.2 | | 26.8 | 0 | 73.2 | | |
| Total % | 8.1 | 41.6 | 0 | 49.7 | 0 | 0 | 0 | | 0 | 39 | 2.6 | 41.6 | 2.3 | 0 | 6.4 | 8.7 | |

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | PESCADOR POINT DR Eastbound | | | | Int. Total |
|---------------------|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|------------|----------|------------|--------------------------------|----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:45 | 4 | 22 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 2 | 0 | 3 | 5 | 55 |
| 17:00 | 8 | 25 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 36 | 2 | 38 | 1 | 0 | 3 | 4 | 75 |
| 17:15 | 3 | 28 | 0 | 31 | 0 | 0 | 0 | 0 | 0 | 31 | 3 | 34 | 1 | 0 | 2 | 3 | 68 |
| 17:30 | 4 | 32 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 17 | 1 | 18 | 0 | 0 | 1 | 1 | 55 |
| Total Volume | 19 | 107 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 108 | 6 | 114 | 4 | 0 | 9 | 13 | 253 |
| % App. Total | 15.1 | 84.9 | 0 | | 0 | 0 | 0 | | 0 | 94.7 | 5.3 | | 30.8 | 0 | 69.2 | | |
| PHF | .594 | .836 | .000 | .875 | .000 | .000 | .000 | .000 | .000 | .750 | .500 | .750 | .500 | .000 | .750 | .650 | .843 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:45



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : monarch-pecador-s
Site Code : 29
Start Date : 5/18/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | PESCADOR POINT DR Eastbound | | | | Int. Total |
|--------------------|------------------------------|------------|----------|------------|----------------|----------|----------|------------|------------------------------|------------|-----------|------------|--------------------------------|----------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 6 | 35 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 25 | 3 | 28 | 1 | 0 | 4 | 5 | 74 |
| 10:15 | 3 | 31 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 26 | 2 | 28 | 1 | 0 | 2 | 3 | 65 |
| 10:30 | 5 | 41 | 0 | 46 | 0 | 0 | 0 | 0 | 0 | 28 | 1 | 29 | 1 | 0 | 2 | 3 | 78 |
| 10:45 | 3 | 26 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 22 | 2 | 24 | 2 | 0 | 1 | 3 | 56 |
| Total | 17 | 133 | 0 | 150 | 0 | 0 | 0 | 0 | 0 | 101 | 8 | 109 | 5 | 0 | 9 | 14 | 273 |
| 11:00 | 2 | 29 | 0 | 31 | 0 | 0 | 0 | 0 | 0 | 33 | 4 | 37 | 3 | 0 | 6 | 9 | 77 |
| 11:15 | 6 | 21 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 16 | 2 | 18 | 3 | 0 | 3 | 6 | 51 |
| 11:30 | 3 | 31 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 32 | 5 | 37 | 1 | 0 | 5 | 6 | 77 |
| 11:45 | 5 | 31 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 23 | 5 | 28 | 3 | 0 | 3 | 6 | 70 |
| Total | 16 | 112 | 0 | 128 | 0 | 0 | 0 | 0 | 0 | 104 | 16 | 120 | 10 | 0 | 17 | 27 | 275 |
| 12:00 | 3 | 32 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 41 | 1 | 42 | 0 | 0 | 6 | 6 | 83 |
| 12:15 | 4 | 29 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 34 | 4 | 38 | 2 | 0 | 5 | 7 | 78 |
| 12:30 | 1 | 25 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 39 | 1 | 40 | 0 | 0 | 12 | 12 | 78 |
| 12:45 | 8 | 25 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 35 | 2 | 37 | 3 | 0 | 8 | 11 | 81 |
| Total | 16 | 111 | 0 | 127 | 0 | 0 | 0 | 0 | 0 | 149 | 8 | 157 | 5 | 0 | 31 | 36 | 320 |
| 13:00 | 4 | 35 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 22 | 4 | 26 | 3 | 0 | 3 | 6 | 71 |
| 13:15 | 5 | 33 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 24 | 4 | 28 | 2 | 0 | 4 | 6 | 72 |
| 13:30 | 3 | 25 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 18 | 2 | 20 | 1 | 0 | 6 | 7 | 55 |
| 13:45 | 3 | 38 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 27 | 1 | 28 | 4 | 0 | 3 | 7 | 76 |
| Total | 15 | 131 | 0 | 146 | 0 | 0 | 0 | 0 | 0 | 91 | 11 | 102 | 10 | 0 | 16 | 26 | 274 |
| Grand Total | 64 | 487 | 0 | 551 | 0 | 0 | 0 | 0 | 0 | 445 | 43 | 488 | 30 | 0 | 73 | 103 | 1142 |
| Apprch % | 11.6 | 88.4 | 0 | | 0 | 0 | 0 | | 0 | 91.2 | 8.8 | | 29.1 | 0 | 70.9 | | |
| Total % | 5.6 | 42.6 | 0 | 48.2 | 0 | 0 | 0 | | 0 | 39 | 3.8 | 42.7 | 2.6 | 0 | 6.4 | 9 | |

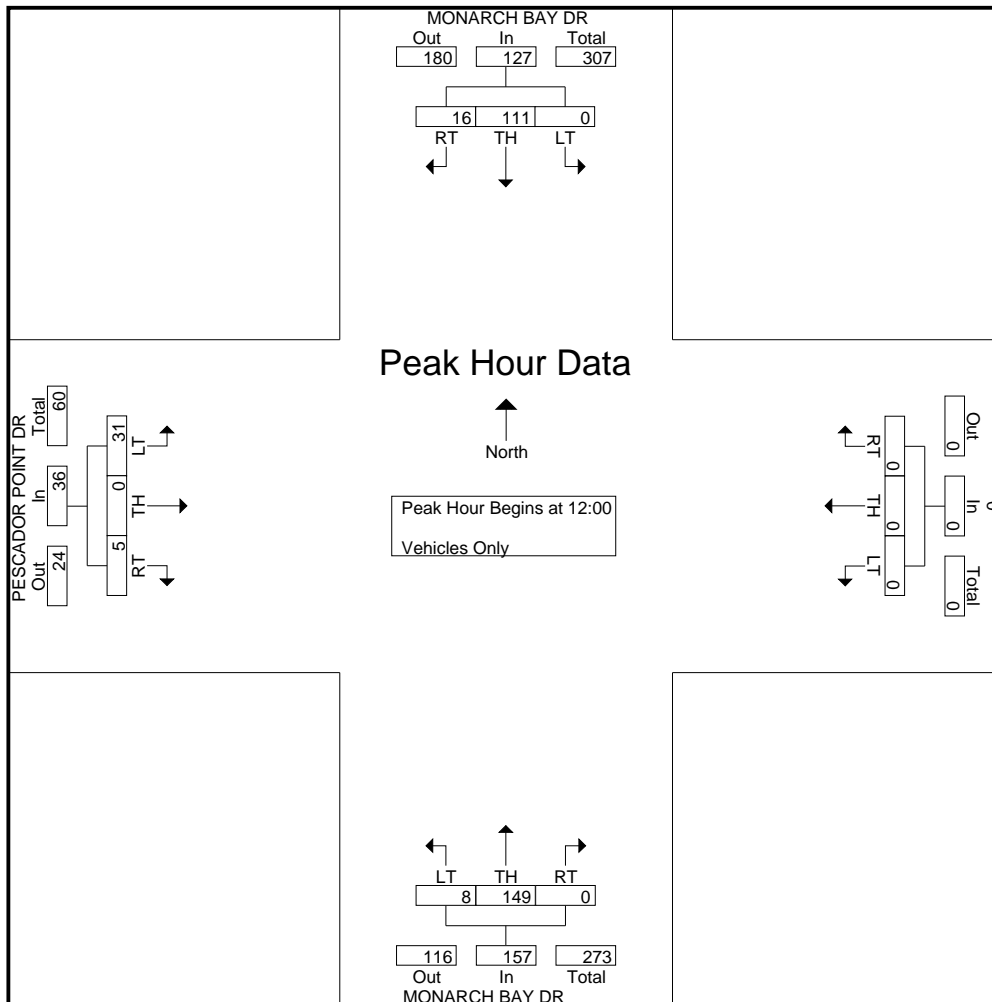
| Start Time | MONARCH BAY DR Southbound | | | | 0 Westbound | | | | MONARCH BAY DR Northbound | | | | PESCADOR POINT DR Eastbound | | | | Int. Total |
|---|------------------------------|-------------|-------------|-------------|----------------|-------------|-------------|-------------|------------------------------|-------------|-------------|-------------|--------------------------------|-------------|-------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:00 | | | | | | | | | | | | | | | | | |
| 12:00 | 3 | 32 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 41 | 1 | 42 | 0 | 0 | 6 | 6 | 83 |
| 12:15 | 4 | 29 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 34 | 4 | 38 | 2 | 0 | 5 | 7 | 78 |
| 12:30 | 1 | 25 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 39 | 1 | 40 | 0 | 0 | 12 | 12 | 78 |
| 12:45 | 8 | 25 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 35 | 2 | 37 | 3 | 0 | 8 | 11 | 81 |
| Total Volume | 16 | 111 | 0 | 127 | 0 | 0 | 0 | 0 | 0 | 149 | 8 | 157 | 5 | 0 | 31 | 36 | 320 |
| % App. Total | 12.6 | 87.4 | 0 | | 0 | 0 | 0 | | 0 | 94.9 | 5.1 | | 13.9 | 0 | 86.1 | | |
| PHF | .500 | .867 | .000 | .907 | .000 | .000 | .000 | .000 | .000 | .909 | .500 | .935 | .417 | .000 | .646 | .750 | .964 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : monarch-pescador-s
Site Code : 29
Start Date : 5/18/2013
Page No : 2



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

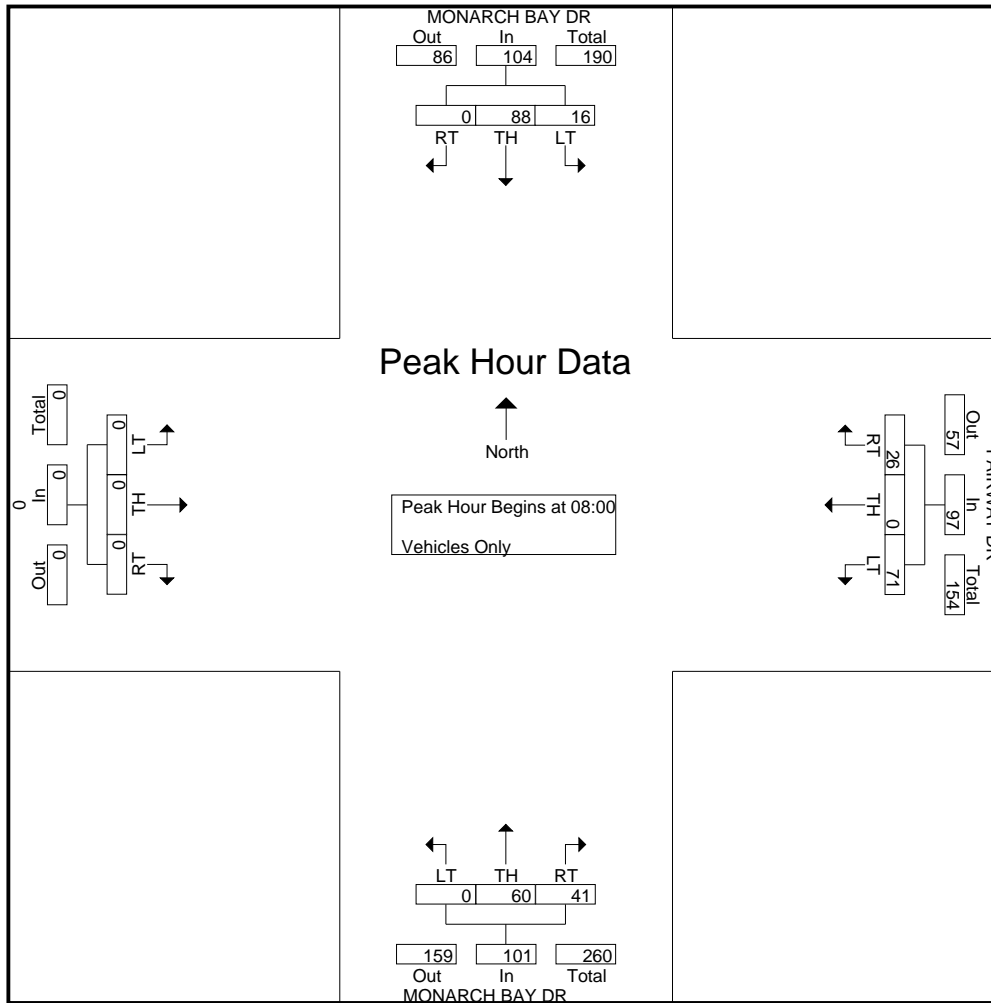
File Name : monarch-fairway-a
Site Code : 30
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | FAIRWAY DR Westbound | | | | MONARCH BAY DR Northbound | | | | 0 Eastbound | | | | Int. Total |
|--------------------|------------------------------|------------|-----------|------------|-------------------------|----------|------------|------------|------------------------------|-----------|----------|------------|----------------|----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 0 | 8 | 5 | 13 | 1 | 0 | 11 | 12 | 8 | 7 | 0 | 15 | 0 | 0 | 0 | 0 | 40 |
| 07:15 | 0 | 15 | 5 | 20 | 4 | 0 | 16 | 20 | 12 | 2 | 0 | 14 | 0 | 0 | 0 | 0 | 54 |
| 07:30 | 0 | 4 | 6 | 10 | 3 | 0 | 14 | 17 | 9 | 3 | 0 | 12 | 0 | 0 | 0 | 0 | 39 |
| 07:45 | 0 | 17 | 3 | 20 | 3 | 0 | 12 | 15 | 7 | 6 | 0 | 13 | 0 | 0 | 0 | 0 | 48 |
| Total | 0 | 44 | 19 | 63 | 11 | 0 | 53 | 64 | 36 | 18 | 0 | 54 | 0 | 0 | 0 | 0 | 181 |
| 08:00 | 0 | 14 | 5 | 19 | 6 | 0 | 21 | 27 | 11 | 9 | 0 | 20 | 0 | 0 | 0 | 0 | 66 |
| 08:15 | 0 | 25 | 7 | 32 | 7 | 0 | 22 | 29 | 10 | 14 | 0 | 24 | 0 | 0 | 0 | 0 | 85 |
| 08:30 | 0 | 21 | 0 | 21 | 6 | 0 | 14 | 20 | 10 | 23 | 0 | 33 | 0 | 0 | 0 | 0 | 74 |
| 08:45 | 0 | 28 | 4 | 32 | 7 | 0 | 14 | 21 | 10 | 14 | 0 | 24 | 0 | 0 | 0 | 0 | 77 |
| Total | 0 | 88 | 16 | 104 | 26 | 0 | 71 | 97 | 41 | 60 | 0 | 101 | 0 | 0 | 0 | 0 | 302 |
| Grand Total | 0 | 132 | 35 | 167 | 37 | 0 | 124 | 161 | 77 | 78 | 0 | 155 | 0 | 0 | 0 | 0 | 483 |
| Apprch % | 0 | 79 | 21 | | 23 | 0 | 77 | | 49.7 | 50.3 | 0 | | 0 | 0 | 0 | | |
| Total % | 0 | 27.3 | 7.2 | 34.6 | 7.7 | 0 | 25.7 | 33.3 | 15.9 | 16.1 | 0 | 32.1 | 0 | 0 | 0 | 0 | |

| Start Time | MONARCH BAY DR Southbound | | | | FAIRWAY DR Westbound | | | | MONARCH BAY DR Northbound | | | | 0 Eastbound | | | | Int. Total |
|---------------------|------------------------------|-----------|-----------|------------|-------------------------|----------|-----------|------------|------------------------------|-----------|----------|------------|----------------|----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 08:00 | 0 | 14 | 5 | 19 | 6 | 0 | 21 | 27 | 11 | 9 | 0 | 20 | 0 | 0 | 0 | 0 | 66 |
| 08:15 | 0 | 25 | 7 | 32 | 7 | 0 | 22 | 29 | 10 | 14 | 0 | 24 | 0 | 0 | 0 | 0 | 85 |
| 08:30 | 0 | 21 | 0 | 21 | 6 | 0 | 14 | 20 | 10 | 23 | 0 | 33 | 0 | 0 | 0 | 0 | 74 |
| 08:45 | 0 | 28 | 4 | 32 | 7 | 0 | 14 | 21 | 10 | 14 | 0 | 24 | 0 | 0 | 0 | 0 | 77 |
| Total Volume | 0 | 88 | 16 | 104 | 26 | 0 | 71 | 97 | 41 | 60 | 0 | 101 | 0 | 0 | 0 | 0 | 302 |
| % App. Total | 0 | 84.6 | 15.4 | | 26.8 | 0 | 73.2 | | 40.6 | 59.4 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .786 | .571 | .813 | .929 | .000 | .807 | .836 | .932 | .652 | .000 | .765 | .000 | .000 | .000 | .000 | .888 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 08:00



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

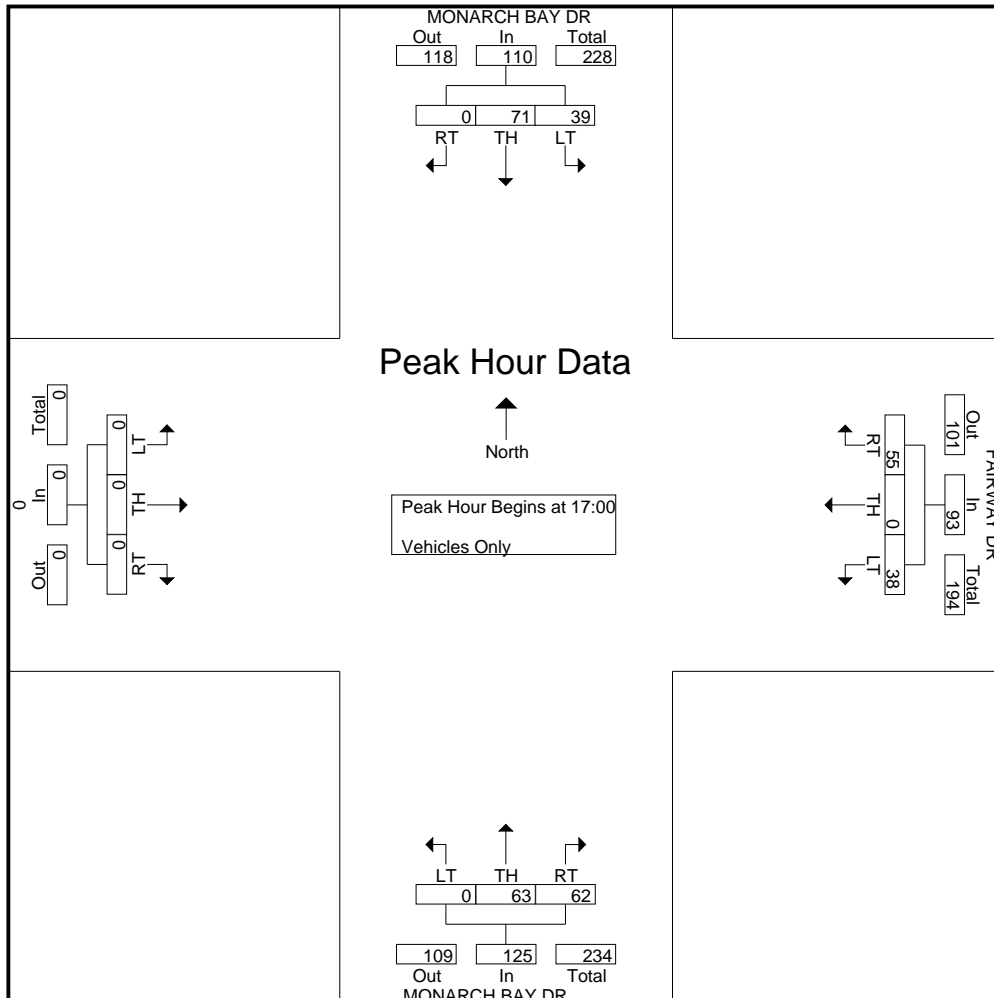
File Name : monarch-fairway-p
Site Code : 30
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | FAIRWAY DR Westbound | | | | MONARCH BAY DR Northbound | | | | 0 Eastbound | | | | Int. Total |
|--------------|------------------------------|-----------|-----------|------------|-------------------------|----------|-----------|------------|------------------------------|-----------|----------|------------|----------------|----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 0 | 17 | 10 | 27 | 8 | 0 | 13 | 21 | 13 | 12 | 0 | 25 | 0 | 0 | 0 | 0 | 73 |
| 16:15 | 0 | 19 | 9 | 28 | 9 | 0 | 9 | 18 | 13 | 11 | 0 | 24 | 0 | 0 | 0 | 0 | 70 |
| 16:30 | 0 | 15 | 11 | 26 | 5 | 0 | 14 | 19 | 5 | 15 | 0 | 20 | 0 | 0 | 0 | 0 | 65 |
| 16:45 | 0 | 21 | 4 | 25 | 9 | 0 | 13 | 22 | 15 | 16 | 0 | 31 | 0 | 0 | 0 | 0 | 78 |
| Total | 0 | 72 | 34 | 106 | 31 | 0 | 49 | 80 | 46 | 54 | 0 | 100 | 0 | 0 | 0 | 0 | 286 |
| 17:00 | 0 | 16 | 11 | 27 | 21 | 0 | 10 | 31 | 21 | 19 | 0 | 40 | 0 | 0 | 0 | 0 | 98 |
| 17:15 | 0 | 15 | 13 | 28 | 11 | 0 | 11 | 22 | 12 | 19 | 0 | 31 | 0 | 0 | 0 | 0 | 81 |
| 17:30 | 0 | 22 | 9 | 31 | 9 | 0 | 7 | 16 | 12 | 10 | 0 | 22 | 0 | 0 | 0 | 0 | 69 |
| 17:45 | 0 | 18 | 6 | 24 | 14 | 0 | 10 | 24 | 17 | 15 | 0 | 32 | 0 | 0 | 0 | 0 | 80 |
| Total | 0 | 71 | 39 | 110 | 55 | 0 | 38 | 93 | 62 | 63 | 0 | 125 | 0 | 0 | 0 | 0 | 328 |
| Grand Total | 0 | 143 | 73 | 216 | 86 | 0 | 87 | 173 | 108 | 117 | 0 | 225 | 0 | 0 | 0 | 0 | 614 |
| Apprch % | 0 | 66.2 | 33.8 | | 49.7 | 0 | 50.3 | | 48 | 52 | 0 | | 0 | 0 | 0 | | |
| Total % | 0 | 23.3 | 11.9 | 35.2 | 14 | 0 | 14.2 | 28.2 | 17.6 | 19.1 | 0 | 36.6 | 0 | 0 | 0 | 0 | |

| Start Time | MONARCH BAY DR Southbound | | | | FAIRWAY DR Westbound | | | | MONARCH BAY DR Northbound | | | | 0 Eastbound | | | | Int. Total |
|---------------------|------------------------------|-----------|-----------|------------|-------------------------|----------|-----------|------------|------------------------------|-----------|----------|------------|----------------|----------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 17:00 | 0 | 16 | 11 | 27 | 21 | 0 | 10 | 31 | 21 | 19 | 0 | 40 | 0 | 0 | 0 | 0 | 98 |
| 17:15 | 0 | 15 | 13 | 28 | 11 | 0 | 11 | 22 | 12 | 19 | 0 | 31 | 0 | 0 | 0 | 0 | 81 |
| 17:30 | 0 | 22 | 9 | 31 | 9 | 0 | 7 | 16 | 12 | 10 | 0 | 22 | 0 | 0 | 0 | 0 | 69 |
| 17:45 | 0 | 18 | 6 | 24 | 14 | 0 | 10 | 24 | 17 | 15 | 0 | 32 | 0 | 0 | 0 | 0 | 80 |
| Total Volume | 0 | 71 | 39 | 110 | 55 | 0 | 38 | 93 | 62 | 63 | 0 | 125 | 0 | 0 | 0 | 0 | 328 |
| % App. Total | 0 | 64.5 | 35.5 | | 59.1 | 0 | 40.9 | | 49.6 | 50.4 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .807 | .750 | .887 | .655 | .000 | .864 | .750 | .738 | .829 | .000 | .781 | .000 | .000 | .000 | .000 | .837 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 17:00



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : monarch-fairway-s
Site Code : 30
Start Date : 5/18/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MONARCH BAY DR Southbound | | | | FAIRWAY DR Westbound | | | | MONARCH BAY DR Northbound | | | | 0 Eastbound | | | | Int. Total |
|-------------|------------------------------|------|------|------------|-------------------------|----|------|------------|------------------------------|------|----|------------|----------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 0 | 31 | 7 | 38 | 6 | 0 | 6 | 12 | 11 | 19 | 0 | 30 | 0 | 0 | 0 | 0 | 80 |
| 10:15 | 0 | 28 | 8 | 36 | 5 | 0 | 7 | 12 | 12 | 24 | 0 | 36 | 0 | 0 | 0 | 0 | 84 |
| 10:30 | 0 | 40 | 5 | 45 | 7 | 0 | 10 | 17 | 15 | 22 | 0 | 37 | 0 | 0 | 0 | 0 | 99 |
| 10:45 | 0 | 22 | 6 | 28 | 5 | 0 | 11 | 16 | 6 | 22 | 0 | 28 | 0 | 0 | 0 | 0 | 72 |
| Total | 0 | 121 | 26 | 147 | 23 | 0 | 34 | 57 | 44 | 87 | 0 | 131 | 0 | 0 | 0 | 0 | 335 |
| 11:00 | 0 | 29 | 4 | 33 | 11 | 0 | 7 | 18 | 12 | 29 | 0 | 41 | 0 | 0 | 0 | 0 | 92 |
| 11:15 | 0 | 22 | 4 | 26 | 6 | 0 | 5 | 11 | 14 | 15 | 0 | 29 | 0 | 0 | 0 | 0 | 66 |
| 11:30 | 0 | 29 | 9 | 38 | 13 | 0 | 22 | 35 | 17 | 25 | 0 | 42 | 0 | 0 | 0 | 0 | 115 |
| 11:45 | 0 | 26 | 6 | 32 | 5 | 0 | 11 | 16 | 7 | 23 | 0 | 30 | 0 | 0 | 0 | 0 | 78 |
| Total | 0 | 106 | 23 | 129 | 35 | 0 | 45 | 80 | 50 | 92 | 0 | 142 | 0 | 0 | 0 | 0 | 351 |
| 12:00 | 0 | 28 | 9 | 37 | 9 | 0 | 14 | 23 | 10 | 35 | 0 | 45 | 0 | 0 | 0 | 0 | 105 |
| 12:15 | 0 | 22 | 11 | 33 | 11 | 0 | 10 | 21 | 17 | 26 | 0 | 43 | 0 | 0 | 0 | 0 | 97 |
| 12:30 | 0 | 22 | 7 | 29 | 5 | 0 | 11 | 16 | 14 | 32 | 0 | 46 | 0 | 0 | 0 | 0 | 91 |
| 12:45 | 0 | 20 | 9 | 29 | 13 | 0 | 9 | 22 | 10 | 25 | 0 | 35 | 0 | 0 | 0 | 0 | 86 |
| Total | 0 | 92 | 36 | 128 | 38 | 0 | 44 | 82 | 51 | 118 | 0 | 169 | 0 | 0 | 0 | 0 | 379 |
| 13:00 | 0 | 29 | 11 | 40 | 10 | 0 | 7 | 17 | 12 | 19 | 0 | 31 | 0 | 0 | 0 | 0 | 88 |
| 13:15 | 0 | 30 | 7 | 37 | 7 | 0 | 4 | 11 | 10 | 20 | 0 | 30 | 0 | 0 | 0 | 0 | 78 |
| 13:30 | 0 | 20 | 9 | 29 | 4 | 0 | 8 | 12 | 9 | 17 | 0 | 26 | 0 | 0 | 0 | 0 | 67 |
| 13:45 | 0 | 30 | 11 | 41 | 5 | 0 | 12 | 17 | 13 | 26 | 0 | 39 | 0 | 0 | 0 | 0 | 97 |
| Total | 0 | 109 | 38 | 147 | 26 | 0 | 31 | 57 | 44 | 82 | 0 | 126 | 0 | 0 | 0 | 0 | 330 |
| Grand Total | 0 | 428 | 123 | 551 | 122 | 0 | 154 | 276 | 189 | 379 | 0 | 568 | 0 | 0 | 0 | 0 | 1395 |
| Apprch % | 0 | 77.7 | 22.3 | | 44.2 | 0 | 55.8 | | 33.3 | 66.7 | 0 | | 0 | 0 | 0 | | |
| Total % | 0 | 30.7 | 8.8 | 39.5 | 8.7 | 0 | 11 | 19.8 | 13.5 | 27.2 | 0 | 40.7 | 0 | 0 | 0 | 0 | |

| Start Time | MONARCH BAY DR Southbound | | | | FAIRWAY DR Westbound | | | | MONARCH BAY DR Northbound | | | | 0 Eastbound | | | | Int. Total |
|--------------|------------------------------|------|------|------------|-------------------------|------|------|------------|------------------------------|------|------|------------|----------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 11:30 | 0 | 29 | 9 | 38 | 13 | 0 | 22 | 35 | 17 | 25 | 0 | 42 | 0 | 0 | 0 | 0 | 115 |
| 11:45 | 0 | 26 | 6 | 32 | 5 | 0 | 11 | 16 | 7 | 23 | 0 | 30 | 0 | 0 | 0 | 0 | 78 |
| 12:00 | 0 | 28 | 9 | 37 | 9 | 0 | 14 | 23 | 10 | 35 | 0 | 45 | 0 | 0 | 0 | 0 | 105 |
| 12:15 | 0 | 22 | 11 | 33 | 11 | 0 | 10 | 21 | 17 | 26 | 0 | 43 | 0 | 0 | 0 | 0 | 97 |
| Total Volume | 0 | 105 | 35 | 140 | 38 | 0 | 57 | 95 | 51 | 109 | 0 | 160 | 0 | 0 | 0 | 0 | 395 |
| % App. Total | 0 | 75 | 25 | | 40 | 0 | 60 | | 31.9 | 68.1 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .905 | .795 | .921 | .731 | .000 | .648 | .679 | .750 | .779 | .000 | .889 | .000 | .000 | .000 | .000 | .859 |

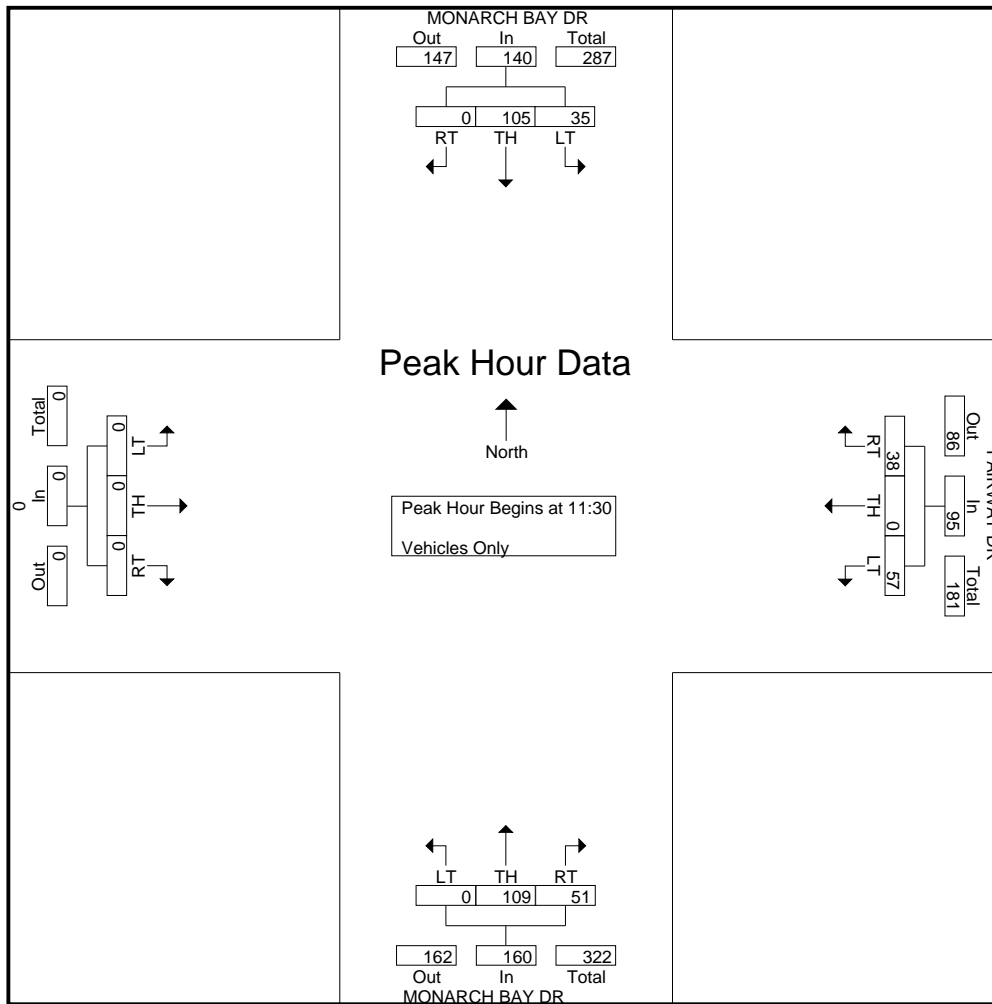
Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 11:30

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : monarch-fairway-s
Site Code : 30
Start Date : 5/18/2013
Page No : 2



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

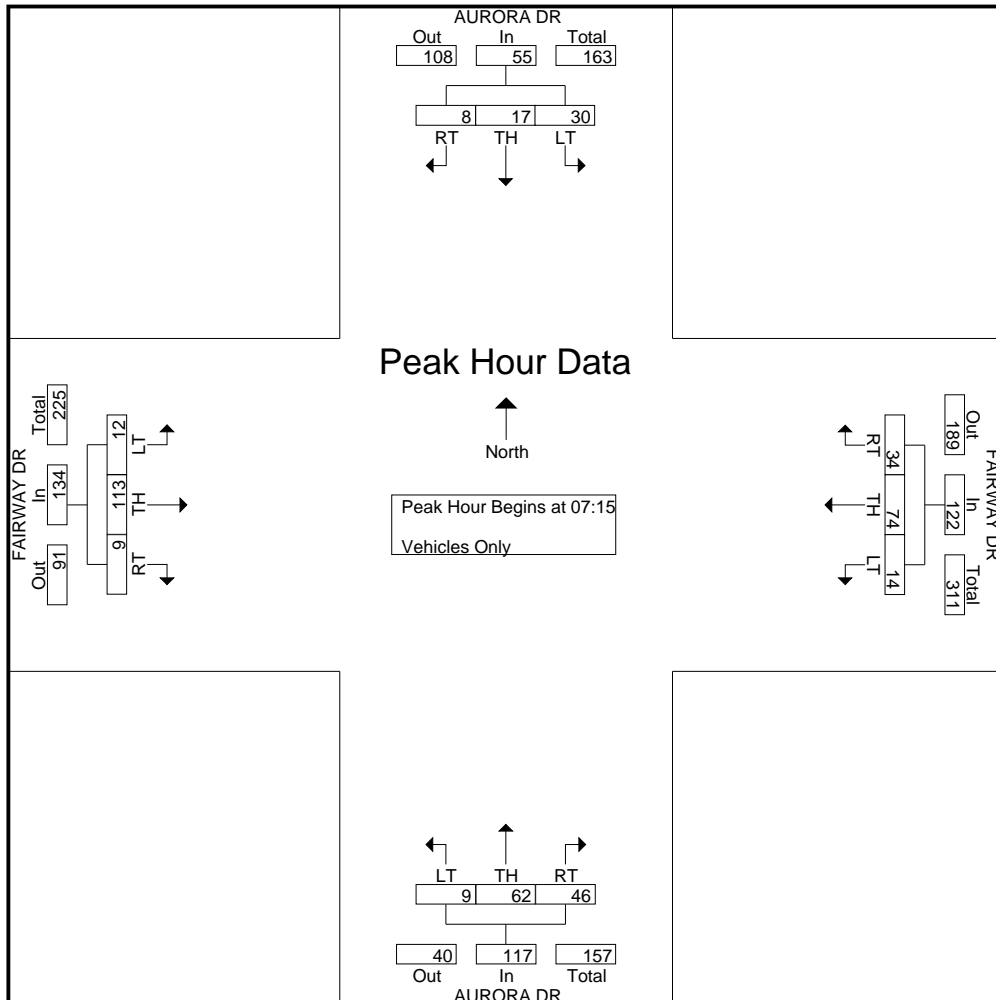
File Name : aurora-fairway-a
Site Code : 5
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | AURORA DR Southbound | | | | FAIRWAY DR Westbound | | | | AURORA DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 2 | 0 | 0 | 2 | 1 | 11 | 1 | 13 | 4 | 8 | 1 | 13 | 2 | 30 | 2 | 34 | 62 |
| 07:15 | 1 | 4 | 7 | 12 | 6 | 17 | 0 | 23 | 14 | 14 | 4 | 32 | 2 | 29 | 2 | 33 | 100 |
| 07:30 | 1 | 4 | 7 | 12 | 5 | 15 | 3 | 23 | 16 | 16 | 1 | 33 | 2 | 30 | 4 | 36 | 104 |
| 07:45 | 3 | 4 | 13 | 20 | 12 | 17 | 4 | 33 | 8 | 13 | 1 | 22 | 3 | 28 | 2 | 33 | 108 |
| Total | 7 | 12 | 27 | 46 | 24 | 60 | 8 | 92 | 42 | 51 | 7 | 100 | 9 | 117 | 10 | 136 | 374 |
| 08:00 | 3 | 5 | 3 | 11 | 11 | 25 | 7 | 43 | 8 | 19 | 3 | 30 | 2 | 26 | 4 | 32 | 116 |
| 08:15 | 9 | 7 | 5 | 21 | 3 | 25 | 4 | 32 | 9 | 2 | 3 | 14 | 1 | 22 | 3 | 26 | 93 |
| 08:30 | 1 | 0 | 3 | 4 | 2 | 19 | 6 | 27 | 4 | 3 | 2 | 9 | 1 | 23 | 1 | 25 | 65 |
| 08:45 | 3 | 5 | 1 | 9 | 5 | 21 | 6 | 32 | 8 | 2 | 4 | 14 | 3 | 19 | 3 | 25 | 80 |
| Total | 16 | 17 | 12 | 45 | 21 | 90 | 23 | 134 | 29 | 26 | 12 | 67 | 7 | 90 | 11 | 108 | 354 |
| Grand Total | 23 | 29 | 39 | 91 | 45 | 150 | 31 | 226 | 71 | 77 | 19 | 167 | 16 | 207 | 21 | 244 | 728 |
| Apprch % | 25.3 | 31.9 | 42.9 | | 19.9 | 66.4 | 13.7 | | 42.5 | 46.1 | 11.4 | | 6.6 | 84.8 | 8.6 | | |
| Total % | 3.2 | 4 | 5.4 | 12.5 | 6.2 | 20.6 | 4.3 | 31 | 9.8 | 10.6 | 2.6 | 22.9 | 2.2 | 28.4 | 2.9 | 33.5 | |

| Start Time | AURORA DR Southbound | | | | FAIRWAY DR Westbound | | | | AURORA DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|---------------------|----------------------|-----------|-----------|------------|----------------------|-----------|-----------|------------|----------------------|-----------|----------|------------|----------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:15 | 1 | 4 | 7 | 12 | 6 | 17 | 0 | 23 | 14 | 14 | 4 | 32 | 2 | 29 | 2 | 33 | 100 |
| 07:30 | 1 | 4 | 7 | 12 | 5 | 15 | 3 | 23 | 16 | 16 | 1 | 33 | 2 | 30 | 4 | 36 | 104 |
| 07:45 | 3 | 4 | 13 | 20 | 12 | 17 | 4 | 33 | 8 | 13 | 1 | 22 | 3 | 28 | 2 | 33 | 108 |
| 08:00 | 3 | 5 | 3 | 11 | 11 | 25 | 7 | 43 | 8 | 19 | 3 | 30 | 2 | 26 | 4 | 32 | 116 |
| Total Volume | 8 | 17 | 30 | 55 | 34 | 74 | 14 | 122 | 46 | 62 | 9 | 117 | 9 | 113 | 12 | 134 | 428 |
| % App. Total | 14.5 | 30.9 | 54.5 | | 27.9 | 60.7 | 11.5 | | 39.3 | 53 | 7.7 | | 6.7 | 84.3 | 9 | | |
| PHF | .667 | .850 | .577 | .688 | .708 | .740 | .500 | .709 | .719 | .816 | .563 | .886 | .750 | .942 | .750 | .931 | .922 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:15



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
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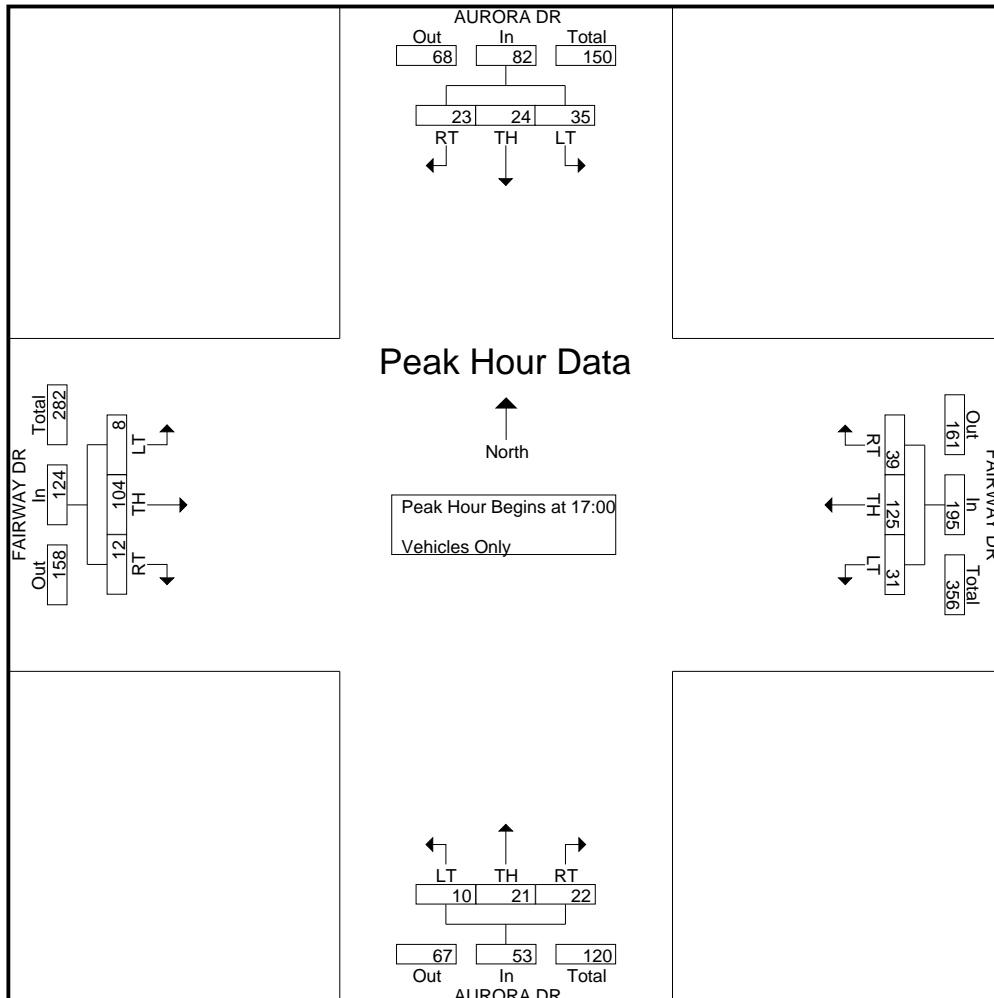
File Name : aurora-fairway-p
Site Code : 5
Start Date : 5/30/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | AURORA DR Southbound | | | | FAIRWAY DR Westbound | | | | AURORA DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 6 | 5 | 9 | 20 | 3 | 22 | 11 | 36 | 1 | 3 | 3 | 7 | 2 | 19 | 3 | 24 | 87 |
| 16:15 | 2 | 5 | 1 | 8 | 5 | 23 | 10 | 38 | 6 | 1 | 1 | 8 | 5 | 24 | 3 | 32 | 86 |
| 16:30 | 1 | 2 | 3 | 6 | 6 | 24 | 10 | 40 | 4 | 2 | 0 | 6 | 3 | 14 | 1 | 18 | 70 |
| 16:45 | 3 | 4 | 7 | 14 | 5 | 32 | 2 | 39 | 3 | 3 | 2 | 8 | 0 | 20 | 3 | 23 | 84 |
| Total | 12 | 16 | 20 | 48 | 19 | 101 | 33 | 153 | 14 | 9 | 6 | 29 | 10 | 77 | 10 | 97 | 327 |
| 17:00 | 3 | 8 | 8 | 19 | 11 | 40 | 4 | 55 | 7 | 3 | 2 | 12 | 3 | 30 | 4 | 37 | 123 |
| 17:15 | 9 | 7 | 9 | 25 | 8 | 26 | 11 | 45 | 4 | 4 | 1 | 9 | 4 | 28 | 1 | 33 | 112 |
| 17:30 | 8 | 3 | 5 | 16 | 11 | 28 | 6 | 45 | 4 | 8 | 3 | 15 | 3 | 25 | 1 | 29 | 105 |
| 17:45 | 3 | 6 | 13 | 22 | 9 | 31 | 10 | 50 | 7 | 6 | 4 | 17 | 2 | 21 | 2 | 25 | 114 |
| Total | 23 | 24 | 35 | 82 | 39 | 125 | 31 | 195 | 22 | 21 | 10 | 53 | 12 | 104 | 8 | 124 | 454 |
| Grand Total | 35 | 40 | 55 | 130 | 58 | 226 | 64 | 348 | 36 | 30 | 16 | 82 | 22 | 181 | 18 | 221 | 781 |
| Apprch % | 26.9 | 30.8 | 42.3 | | 16.7 | 64.9 | 18.4 | | 43.9 | 36.6 | 19.5 | | 10 | 81.9 | 8.1 | | |
| Total % | 4.5 | 5.1 | 7 | 16.6 | 7.4 | 28.9 | 8.2 | 44.6 | 4.6 | 3.8 | 2 | 10.5 | 2.8 | 23.2 | 2.3 | 28.3 | |

| Start Time | AURORA DR Southbound | | | | FAIRWAY DR Westbound | | | | AURORA DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|---------------------|----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|----------------------|-----------|-----------|------------|----------------------|------------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 17:00 | 3 | 8 | 8 | 19 | 11 | 40 | 4 | 55 | 7 | 3 | 2 | 12 | 3 | 30 | 4 | 37 | 123 |
| 17:15 | 9 | 7 | 9 | 25 | 8 | 26 | 11 | 45 | 4 | 4 | 1 | 9 | 4 | 28 | 1 | 33 | 112 |
| 17:30 | 8 | 3 | 5 | 16 | 11 | 28 | 6 | 45 | 4 | 8 | 3 | 15 | 3 | 25 | 1 | 29 | 105 |
| 17:45 | 3 | 6 | 13 | 22 | 9 | 31 | 10 | 50 | 7 | 6 | 4 | 17 | 2 | 21 | 2 | 25 | 114 |
| Total Volume | 23 | 24 | 35 | 82 | 39 | 125 | 31 | 195 | 22 | 21 | 10 | 53 | 12 | 104 | 8 | 124 | 454 |
| % App. Total | 28 | 29.3 | 42.7 | | 20 | 64.1 | 15.9 | | 41.5 | 39.6 | 18.9 | | 9.7 | 83.9 | 6.5 | | |
| PHF | .639 | .750 | .673 | .820 | .886 | .781 | .705 | .886 | .786 | .656 | .625 | .779 | .750 | .867 | .500 | .838 | .923 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 17:00



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : aurora-fairway-s
Site Code : 5
Start Date : 5/18/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | AURORA DR Southbound | | | | FAIRWAY DR Westbound | | | | AURORA DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 2 | 4 | 6 | 12 | 4 | 14 | 2 | 20 | 7 | 3 | 3 | 13 | 0 | 24 | 1 | 25 | 70 |
| 10:15 | 0 | 4 | 8 | 12 | 3 | 12 | 10 | 25 | 5 | 3 | 2 | 10 | 5 | 22 | 2 | 29 | 76 |
| 10:30 | 2 | 2 | 3 | 7 | 1 | 20 | 3 | 24 | 7 | 4 | 2 | 13 | 4 | 27 | 0 | 31 | 75 |
| 10:45 | 3 | 4 | 7 | 14 | 7 | 16 | 8 | 31 | 10 | 3 | 3 | 16 | 3 | 21 | 2 | 26 | 87 |
| Total | 7 | 14 | 24 | 45 | 15 | 62 | 23 | 100 | 29 | 13 | 10 | 52 | 12 | 94 | 5 | 111 | 308 |
| 11:00 | 2 | 2 | 4 | 8 | 3 | 15 | 4 | 22 | 3 | 3 | 4 | 10 | 2 | 23 | 1 | 26 | 66 |
| 11:15 | 2 | 6 | 1 | 9 | 5 | 19 | 3 | 27 | 4 | 2 | 3 | 9 | 3 | 26 | 1 | 30 | 75 |
| 11:30 | 5 | 2 | 1 | 8 | 7 | 36 | 3 | 46 | 5 | 7 | 5 | 17 | 3 | 32 | 1 | 36 | 107 |
| 11:45 | 5 | 2 | 6 | 13 | 3 | 13 | 7 | 23 | 12 | 5 | 2 | 19 | 2 | 29 | 1 | 32 | 87 |
| Total | 14 | 12 | 12 | 38 | 18 | 83 | 17 | 118 | 24 | 17 | 14 | 55 | 10 | 110 | 4 | 124 | 335 |
| 12:00 | 1 | 2 | 2 | 5 | 2 | 26 | 9 | 37 | 11 | 5 | 4 | 20 | 3 | 22 | 1 | 26 | 88 |
| 12:15 | 4 | 3 | 5 | 12 | 4 | 27 | 5 | 36 | 4 | 1 | 4 | 9 | 2 | 33 | 1 | 36 | 93 |
| 12:30 | 2 | 3 | 3 | 8 | 9 | 23 | 7 | 39 | 6 | 3 | 3 | 12 | 3 | 30 | 1 | 34 | 93 |
| 12:45 | 3 | 5 | 4 | 12 | 5 | 23 | 6 | 34 | 2 | 4 | 0 | 6 | 2 | 26 | 1 | 29 | 81 |
| Total | 10 | 13 | 14 | 37 | 20 | 99 | 27 | 146 | 23 | 13 | 11 | 47 | 10 | 111 | 4 | 125 | 355 |
| 13:00 | 3 | 5 | 3 | 11 | 1 | 21 | 8 | 30 | 4 | 3 | 6 | 13 | 1 | 28 | 2 | 31 | 85 |
| 13:15 | 3 | 1 | 3 | 7 | 5 | 14 | 5 | 24 | 5 | 2 | 2 | 9 | 2 | 19 | 6 | 27 | 67 |
| 13:30 | 3 | 5 | 4 | 12 | 7 | 18 | 8 | 33 | 5 | 4 | 1 | 10 | 2 | 21 | 1 | 24 | 79 |
| 13:45 | 2 | 4 | 2 | 8 | 6 | 27 | 3 | 36 | 5 | 4 | 2 | 11 | 1 | 29 | 1 | 31 | 86 |
| Total | 11 | 15 | 12 | 38 | 19 | 80 | 24 | 123 | 19 | 13 | 11 | 43 | 6 | 97 | 10 | 113 | 317 |
| Grand Total | 42 | 54 | 62 | 158 | 72 | 324 | 91 | 487 | 95 | 56 | 46 | 197 | 38 | 412 | 23 | 473 | 1315 |
| Apprch % | 26.6 | 34.2 | 39.2 | | 14.8 | 66.5 | 18.7 | | 48.2 | 28.4 | 23.4 | | 8 | 87.1 | 4.9 | | |
| Total % | 3.2 | 4.1 | 4.7 | 12 | 5.5 | 24.6 | 6.9 | 37 | 7.2 | 4.3 | 3.5 | 15 | 2.9 | 31.3 | 1.7 | 36 | |

| Start Time | AURORA DR Southbound | | | | FAIRWAY DR Westbound | | | | AURORA DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|---------------------|----------------------|-------------|-------------|-------------|----------------------|-------------|-------------|-------------|----------------------|-------------|-------------|-------------|----------------------|-------------|-------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 11:30 | 5 | 2 | 1 | 8 | 7 | 36 | 3 | 46 | 5 | 7 | 5 | 17 | 3 | 32 | 1 | 36 | 107 |
| 11:45 | 5 | 2 | 6 | 13 | 3 | 13 | 7 | 23 | 12 | 5 | 2 | 19 | 2 | 29 | 1 | 32 | 87 |
| 12:00 | 1 | 2 | 2 | 5 | 2 | 26 | 9 | 37 | 11 | 5 | 4 | 20 | 3 | 22 | 1 | 26 | 88 |
| 12:15 | 4 | 3 | 5 | 12 | 4 | 27 | 5 | 36 | 4 | 1 | 4 | 9 | 2 | 33 | 1 | 36 | 93 |
| Total Volume | 15 | 9 | 14 | 38 | 16 | 102 | 24 | 142 | 32 | 18 | 15 | 65 | 10 | 116 | 4 | 130 | 375 |
| % App. Total | 39.5 | 23.7 | 36.8 | | 11.3 | 71.8 | 16.9 | | 49.2 | 27.7 | 23.1 | | 7.7 | 89.2 | 3.1 | | |
| PHF | .750 | .750 | .583 | .731 | .571 | .708 | .667 | .772 | .667 | .643 | .750 | .813 | .833 | .879 | 1.00 | .903 | .876 |

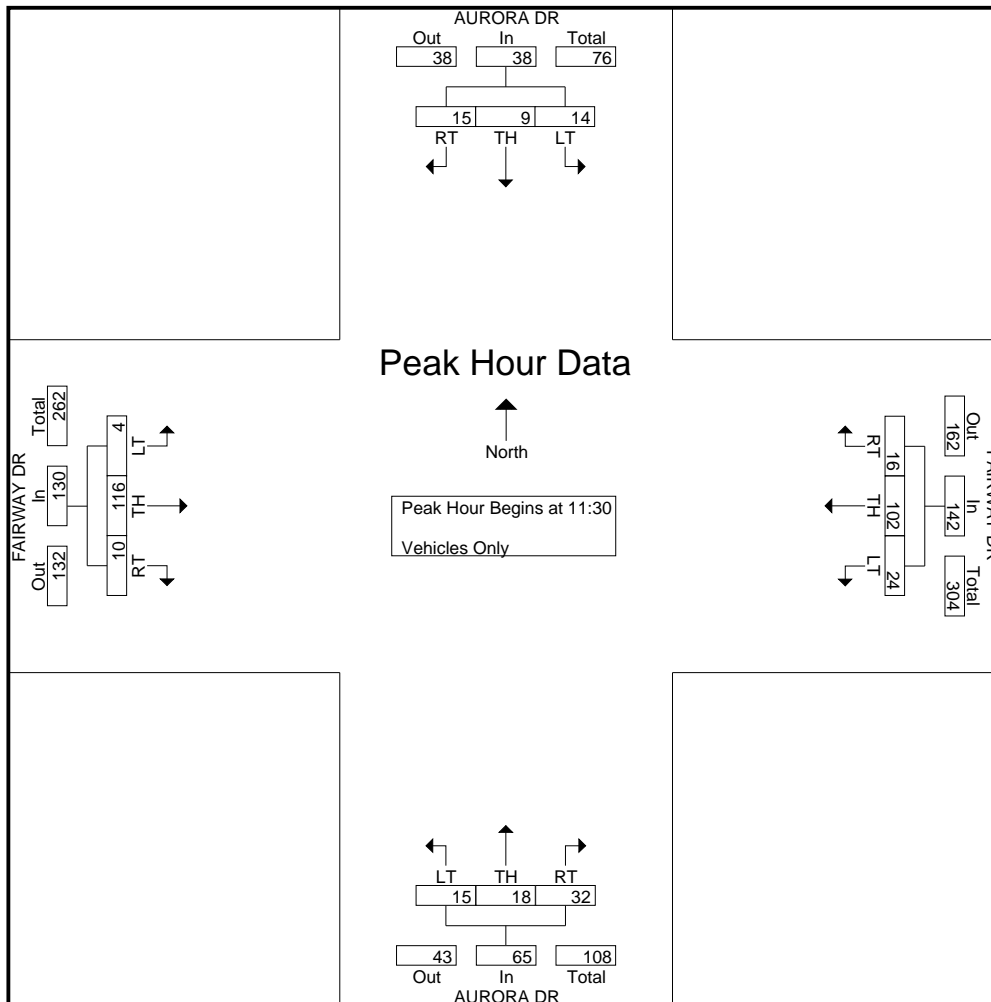
Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 11:30

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : aurora-fairway-s
Site Code : 5
Start Date : 5/18/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

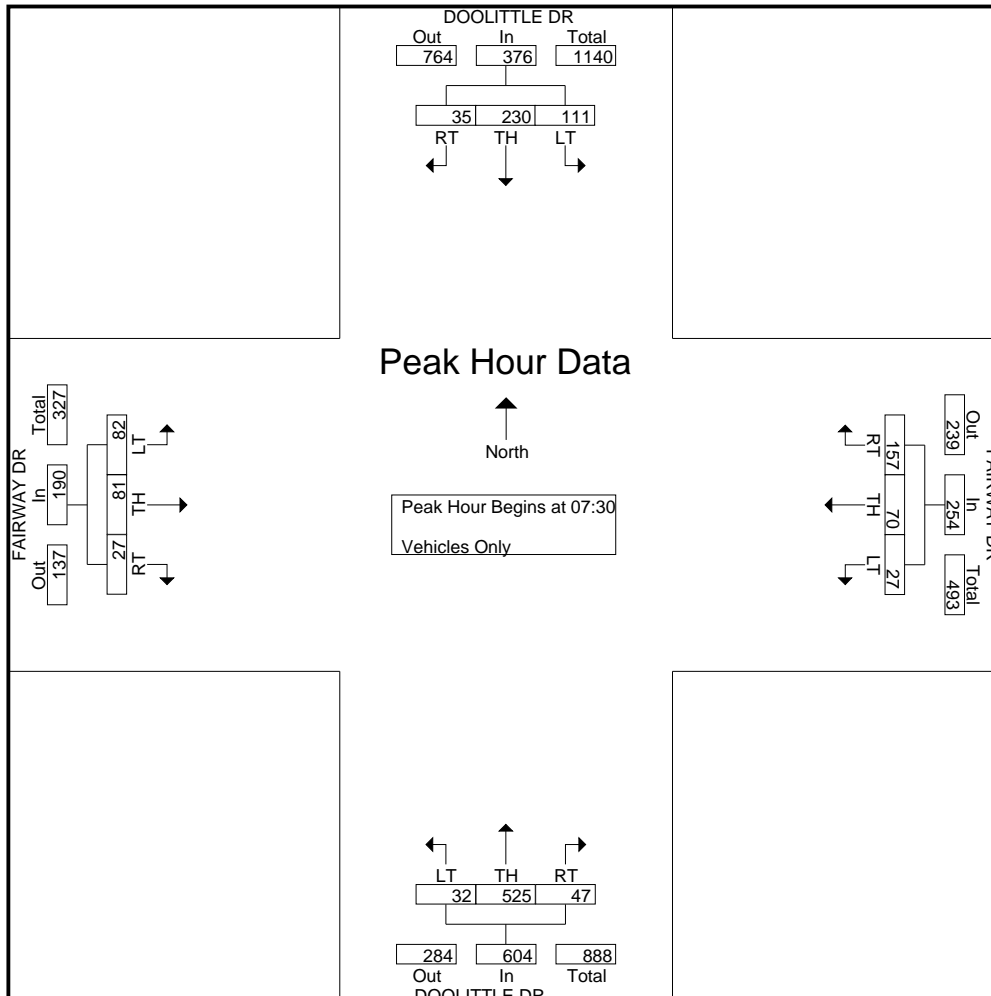
File Name : doolittle-fairway-a
Site Code : 14
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR Southbound | | | | FAIRWAY DR Westbound | | | | DOOLITTLE DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|----------------------------|------------|------------|------------|-------------------------|------------|-----------|------------|----------------------------|------------|-----------|------------|-------------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 4 | 46 | 17 | 67 | 17 | 8 | 2 | 27 | 8 | 60 | 0 | 68 | 3 | 11 | 20 | 34 | 196 |
| 07:15 | 3 | 40 | 13 | 56 | 19 | 12 | 3 | 34 | 8 | 92 | 2 | 102 | 7 | 19 | 20 | 46 | 238 |
| 07:30 | 11 | 47 | 29 | 87 | 24 | 8 | 5 | 37 | 12 | 131 | 2 | 145 | 6 | 16 | 24 | 46 | 315 |
| 07:45 | 9 | 53 | 26 | 88 | 52 | 13 | 7 | 72 | 20 | 150 | 9 | 179 | 6 | 28 | 15 | 49 | 388 |
| Total | 27 | 186 | 85 | 298 | 112 | 41 | 17 | 170 | 48 | 433 | 13 | 494 | 22 | 74 | 79 | 175 | 1137 |
| 08:00 | 4 | 67 | 28 | 99 | 51 | 26 | 11 | 88 | 4 | 142 | 14 | 160 | 7 | 21 | 23 | 51 | 398 |
| 08:15 | 11 | 63 | 28 | 102 | 30 | 23 | 4 | 57 | 11 | 102 | 7 | 120 | 8 | 16 | 20 | 44 | 323 |
| 08:30 | 9 | 67 | 22 | 98 | 40 | 15 | 6 | 61 | 10 | 96 | 2 | 108 | 7 | 20 | 12 | 39 | 306 |
| 08:45 | 15 | 60 | 35 | 110 | 40 | 8 | 4 | 52 | 9 | 80 | 6 | 95 | 8 | 15 | 11 | 34 | 291 |
| Total | 39 | 257 | 113 | 409 | 161 | 72 | 25 | 258 | 34 | 420 | 29 | 483 | 30 | 72 | 66 | 168 | 1318 |
| Grand Total | 66 | 443 | 198 | 707 | 273 | 113 | 42 | 428 | 82 | 853 | 42 | 977 | 52 | 146 | 145 | 343 | 2455 |
| Apprch % | 9.3 | 62.7 | 28 | | 63.8 | 26.4 | 9.8 | | 8.4 | 87.3 | 4.3 | | 15.2 | 42.6 | 42.3 | | |
| Total % | 2.7 | 18 | 8.1 | 28.8 | 11.1 | 4.6 | 1.7 | 17.4 | 3.3 | 34.7 | 1.7 | 39.8 | 2.1 | 5.9 | 5.9 | 14 | |

| Start Time | DOOLITTLE DR Southbound | | | | FAIRWAY DR Westbound | | | | DOOLITTLE DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|---------------------|----------------------------|------------|------------|------------|-------------------------|-----------|-----------|------------|----------------------------|------------|-----------|------------|-------------------------|-----------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 11 | 47 | 29 | 87 | 24 | 8 | 5 | 37 | 12 | 131 | 2 | 145 | 6 | 16 | 24 | 46 | 315 |
| 07:45 | 9 | 53 | 26 | 88 | 52 | 13 | 7 | 72 | 20 | 150 | 9 | 179 | 6 | 28 | 15 | 49 | 388 |
| 08:00 | 4 | 67 | 28 | 99 | 51 | 26 | 11 | 88 | 4 | 142 | 14 | 160 | 7 | 21 | 23 | 51 | 398 |
| 08:15 | 11 | 63 | 28 | 102 | 30 | 23 | 4 | 57 | 11 | 102 | 7 | 120 | 8 | 16 | 20 | 44 | 323 |
| Total Volume | 35 | 230 | 111 | 376 | 157 | 70 | 27 | 254 | 47 | 525 | 32 | 604 | 27 | 81 | 82 | 190 | 1424 |
| % App. Total | 9.3 | 61.2 | 29.5 | | 61.8 | 27.6 | 10.6 | | 7.8 | 86.9 | 5.3 | | 14.2 | 42.6 | 43.2 | | |
| PHF | .795 | .858 | .957 | .922 | .755 | .673 | .614 | .722 | .588 | .875 | .571 | .844 | .844 | .723 | .854 | .931 | .894 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

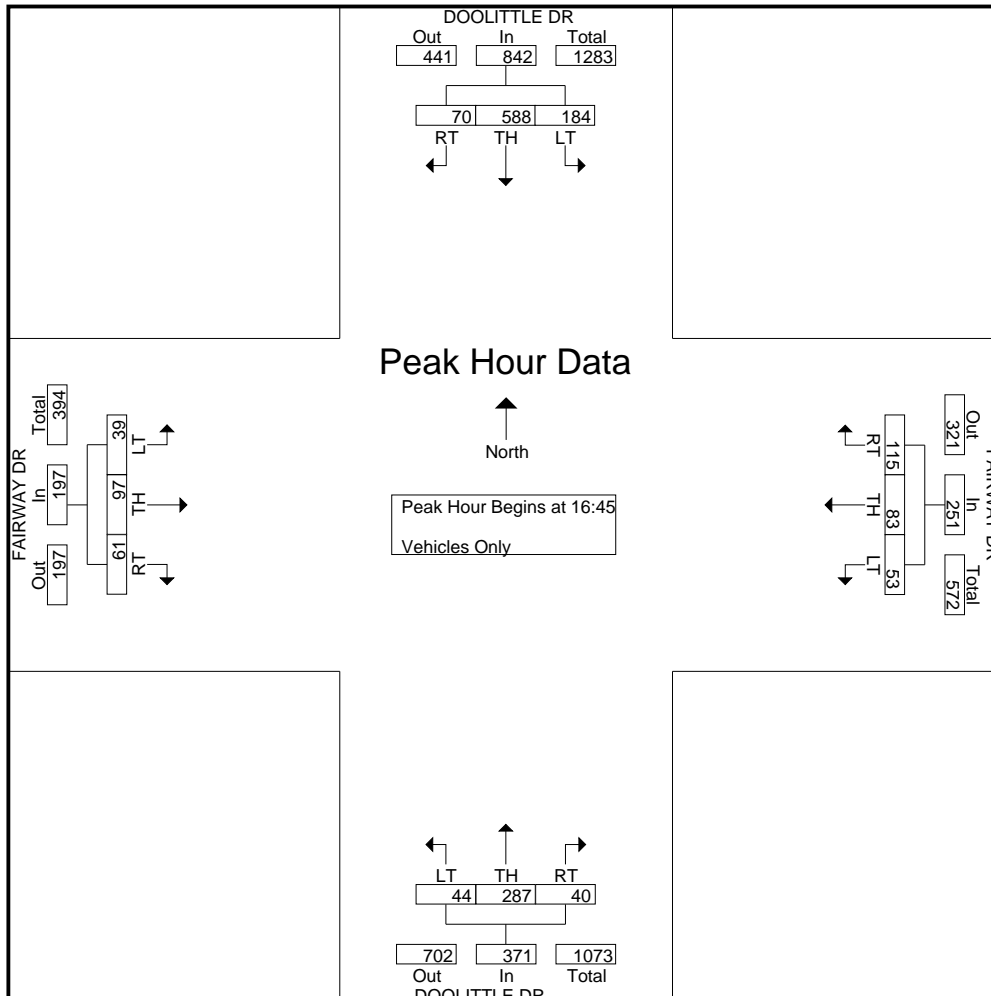
CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-fairway-p
Site Code : 14
Start Date : 1/17/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR Southbound | | | | FAIRWAY DR Westbound | | | | DOOLITTLE DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|-------------------------|------------|------------|-------------|----------------------|------------|------------|------------|-------------------------|------------|------------|------------|----------------------|------------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 22 | 89 | 27 | 138 | 36 | 14 | 10 | 60 | 12 | 60 | 15 | 87 | 13 | 18 | 6 | 37 | 322 |
| 16:15 | 16 | 95 | 31 | 142 | 27 | 25 | 7 | 59 | 8 | 82 | 15 | 105 | 11 | 15 | 8 | 34 | 340 |
| 16:30 | 8 | 115 | 33 | 156 | 33 | 16 | 16 | 65 | 7 | 74 | 11 | 92 | 6 | 20 | 15 | 41 | 354 |
| 16:45 | 20 | 134 | 43 | 197 | 21 | 13 | 9 | 43 | 13 | 67 | 11 | 91 | 16 | 23 | 10 | 49 | 380 |
| Total | 66 | 433 | 134 | 633 | 117 | 68 | 42 | 227 | 40 | 283 | 52 | 375 | 46 | 76 | 39 | 161 | 1396 |
| 17:00 | 12 | 133 | 43 | 188 | 31 | 21 | 15 | 67 | 13 | 88 | 12 | 113 | 10 | 27 | 16 | 53 | 421 |
| 17:15 | 20 | 180 | 51 | 251 | 36 | 24 | 16 | 76 | 7 | 61 | 11 | 79 | 15 | 28 | 9 | 52 | 458 |
| 17:30 | 18 | 141 | 47 | 206 | 27 | 25 | 13 | 65 | 7 | 71 | 10 | 88 | 20 | 19 | 4 | 43 | 402 |
| 17:45 | 14 | 100 | 31 | 145 | 25 | 20 | 15 | 60 | 10 | 65 | 15 | 90 | 13 | 18 | 14 | 45 | 340 |
| Total | 64 | 554 | 172 | 790 | 119 | 90 | 59 | 268 | 37 | 285 | 48 | 370 | 58 | 92 | 43 | 193 | 1621 |
| Grand Total | 130 | 987 | 306 | 1423 | 236 | 158 | 101 | 495 | 77 | 568 | 100 | 745 | 104 | 168 | 82 | 354 | 3017 |
| Apprch % | 9.1 | 69.4 | 21.5 | | 47.7 | 31.9 | 20.4 | | 10.3 | 76.2 | 13.4 | | 29.4 | 47.5 | 23.2 | | |
| Total % | 4.3 | 32.7 | 10.1 | 47.2 | 7.8 | 5.2 | 3.3 | 16.4 | 2.6 | 18.8 | 3.3 | 24.7 | 3.4 | 5.6 | 2.7 | 11.7 | |

| Start Time | DOOLITTLE DR Southbound | | | | FAIRWAY DR Westbound | | | | DOOLITTLE DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--|-------------------------|------|------|------------|----------------------|------|------|------------|-------------------------|------|------|------------|----------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 16:45 | | | | | | | | | | | | | | | | | |
| 16:45 | 20 | 134 | 43 | 197 | 21 | 13 | 9 | 43 | 13 | 67 | 11 | 91 | 16 | 23 | 10 | 49 | 380 |
| 17:00 | 12 | 133 | 43 | 188 | 31 | 21 | 15 | 67 | 13 | 88 | 12 | 113 | 10 | 27 | 16 | 53 | 421 |
| 17:15 | 20 | 180 | 51 | 251 | 36 | 24 | 16 | 76 | 7 | 61 | 11 | 79 | 15 | 28 | 9 | 52 | 458 |
| 17:30 | 18 | 141 | 47 | 206 | 27 | 25 | 13 | 65 | 7 | 71 | 10 | 88 | 20 | 19 | 4 | 43 | 402 |
| Total Volume | 70 | 588 | 184 | 842 | 115 | 83 | 53 | 251 | 40 | 287 | 44 | 371 | 61 | 97 | 39 | 197 | 1661 |
| % App. Total | 8.3 | 69.8 | 21.9 | | 45.8 | 33.1 | 21.1 | | 10.8 | 77.4 | 11.9 | | 31 | 49.2 | 19.8 | | |
| PHF | .875 | .817 | .902 | .839 | .799 | .830 | .828 | .826 | .769 | .815 | .917 | .821 | .763 | .866 | .609 | .929 | .907 |



MARKS TRAFFIC DATA
mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-fairway-s
Site Code : 14
Start Date : 1/26/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | DOOLITTLE DR Southbound | | | | FAIRWAY DR Westbound | | | | DOOLITTLE DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|-------------|-------------------------|------|------|------------|----------------------|------|------|------------|-------------------------|------|------|------------|----------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 16 | 49 | 15 | 80 | 14 | 10 | 0 | 24 | 4 | 48 | 12 | 64 | 5 | 14 | 9 | 28 | 196 |
| 10:15 | 12 | 53 | 24 | 89 | 9 | 15 | 9 | 33 | 9 | 46 | 10 | 65 | 8 | 17 | 20 | 45 | 232 |
| 10:30 | 9 | 45 | 12 | 66 | 16 | 14 | 0 | 30 | 7 | 64 | 2 | 73 | 13 | 33 | 9 | 55 | 224 |
| 10:45 | 9 | 51 | 19 | 79 | 15 | 17 | 8 | 40 | 6 | 64 | 6 | 76 | 9 | 31 | 10 | 50 | 245 |
| Total | 46 | 198 | 70 | 314 | 54 | 56 | 17 | 127 | 26 | 222 | 30 | 278 | 35 | 95 | 48 | 178 | 897 |
| 11:00 | 14 | 56 | 15 | 85 | 10 | 11 | 10 | 31 | 9 | 48 | 14 | 71 | 7 | 18 | 14 | 39 | 226 |
| 11:15 | 10 | 46 | 20 | 76 | 13 | 12 | 7 | 32 | 16 | 49 | 11 | 76 | 10 | 19 | 6 | 35 | 219 |
| 11:30 | 12 | 49 | 22 | 83 | 22 | 13 | 8 | 43 | 10 | 52 | 11 | 73 | 12 | 18 | 12 | 42 | 241 |
| 11:45 | 9 | 60 | 22 | 91 | 13 | 6 | 5 | 24 | 11 | 58 | 16 | 85 | 12 | 23 | 13 | 48 | 248 |
| Total | 45 | 211 | 79 | 335 | 58 | 42 | 30 | 130 | 46 | 207 | 52 | 305 | 41 | 78 | 45 | 164 | 934 |
| 12:00 | 13 | 54 | 22 | 89 | 19 | 17 | 13 | 49 | 6 | 39 | 8 | 53 | 9 | 25 | 13 | 47 | 238 |
| 12:15 | 15 | 40 | 21 | 76 | 19 | 7 | 15 | 41 | 7 | 58 | 12 | 77 | 18 | 25 | 13 | 56 | 250 |
| 12:30 | 11 | 66 | 19 | 96 | 22 | 15 | 10 | 47 | 7 | 53 | 11 | 71 | 13 | 35 | 14 | 62 | 276 |
| 12:45 | 16 | 54 | 27 | 97 | 21 | 15 | 8 | 44 | 7 | 67 | 16 | 90 | 17 | 21 | 18 | 56 | 287 |
| Total | 55 | 214 | 89 | 358 | 81 | 54 | 46 | 181 | 27 | 217 | 47 | 291 | 57 | 106 | 58 | 221 | 1051 |
| 13:00 | 14 | 72 | 23 | 109 | 19 | 25 | 7 | 51 | 10 | 45 | 11 | 66 | 14 | 27 | 13 | 54 | 280 |
| 13:15 | 15 | 41 | 21 | 77 | 22 | 22 | 9 | 53 | 7 | 61 | 12 | 80 | 5 | 29 | 16 | 50 | 260 |
| 13:30 | 16 | 72 | 26 | 114 | 16 | 23 | 10 | 49 | 6 | 68 | 8 | 82 | 15 | 18 | 12 | 45 | 290 |
| 13:45 | 17 | 64 | 29 | 110 | 19 | 15 | 13 | 47 | 4 | 66 | 14 | 84 | 4 | 22 | 17 | 43 | 284 |
| Total | 62 | 249 | 99 | 410 | 76 | 85 | 39 | 200 | 27 | 240 | 45 | 312 | 38 | 96 | 58 | 192 | 1114 |
| Grand Total | 208 | 872 | 337 | 1417 | 269 | 237 | 132 | 638 | 126 | 886 | 174 | 1186 | 171 | 375 | 209 | 755 | 3996 |
| Apprch % | 14.7 | 61.5 | 23.8 | | 42.2 | 37.1 | 20.7 | | 10.6 | 74.7 | 14.7 | | 22.6 | 49.7 | 27.7 | | |
| Total % | 5.2 | 21.8 | 8.4 | 35.5 | 6.7 | 5.9 | 3.3 | 16 | 3.2 | 22.2 | 4.4 | 29.7 | 4.3 | 9.4 | 5.2 | 18.9 | |

| Start Time | DOOLITTLE DR Southbound | | | | FAIRWAY DR Westbound | | | | DOOLITTLE DR Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------|-------------------------|------|------|------------|----------------------|------|------|------------|-------------------------|------|------|------------|----------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 12:45 | 16 | 54 | 27 | 97 | 21 | 15 | 8 | 44 | 7 | 67 | 16 | 90 | 17 | 21 | 18 | 56 | 287 |
| 13:00 | 14 | 72 | 23 | 109 | 19 | 25 | 7 | 51 | 10 | 45 | 11 | 66 | 14 | 27 | 13 | 54 | 280 |
| 13:15 | 15 | 41 | 21 | 77 | 22 | 22 | 9 | 53 | 7 | 61 | 12 | 80 | 5 | 29 | 16 | 50 | 260 |
| 13:30 | 16 | 72 | 26 | 114 | 16 | 23 | 10 | 49 | 6 | 68 | 8 | 82 | 15 | 18 | 12 | 45 | 290 |
| Total Volume | 61 | 239 | 97 | 397 | 78 | 85 | 34 | 197 | 30 | 241 | 47 | 318 | 51 | 95 | 59 | 205 | 1117 |
| % App. Total | 15.4 | 60.2 | 24.4 | | 39.6 | 43.1 | 17.3 | | 9.4 | 75.8 | 14.8 | | 24.9 | 46.3 | 28.8 | | |
| PHF | .953 | .830 | .898 | .871 | .886 | .850 | .850 | .929 | .750 | .886 | .734 | .883 | .750 | .819 | .819 | .915 | .963 |

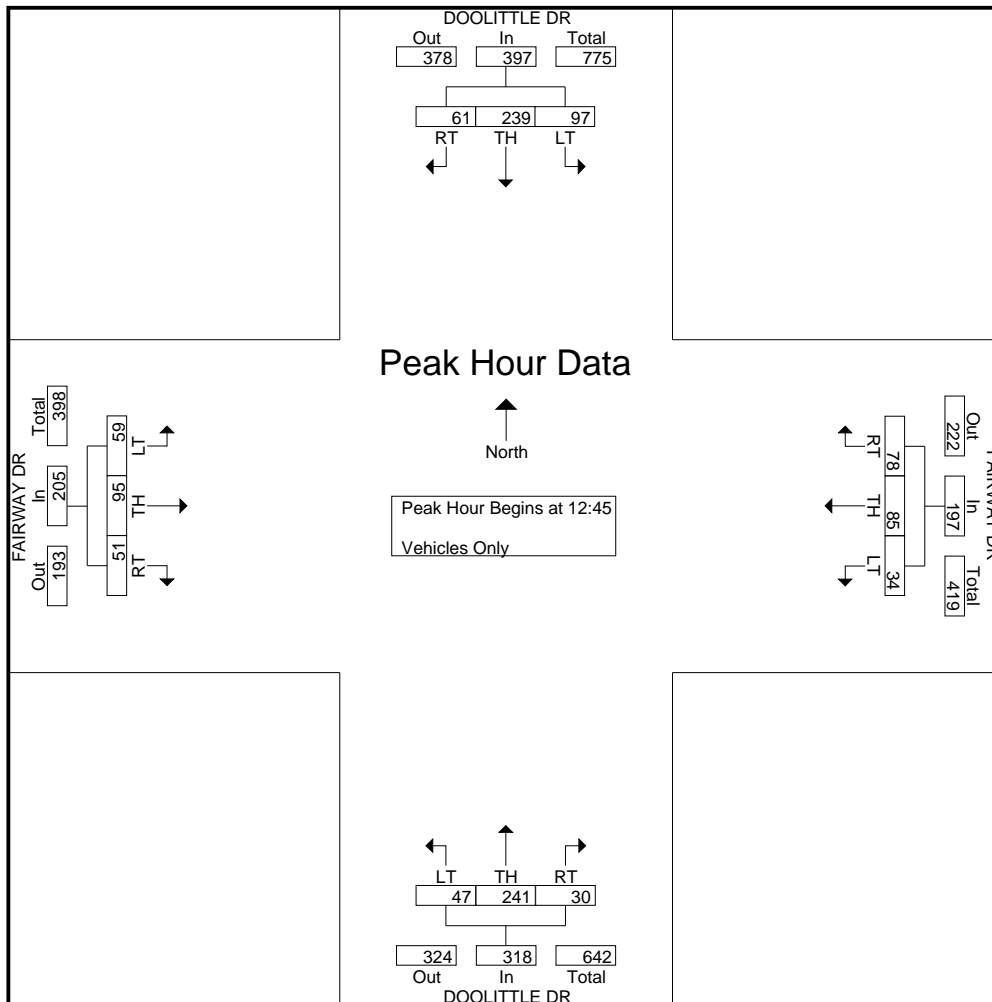
Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 12:45

MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : doolittle-fairway-s
Site Code : 14
Start Date : 1/26/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-fairway-a
Site Code : 15
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

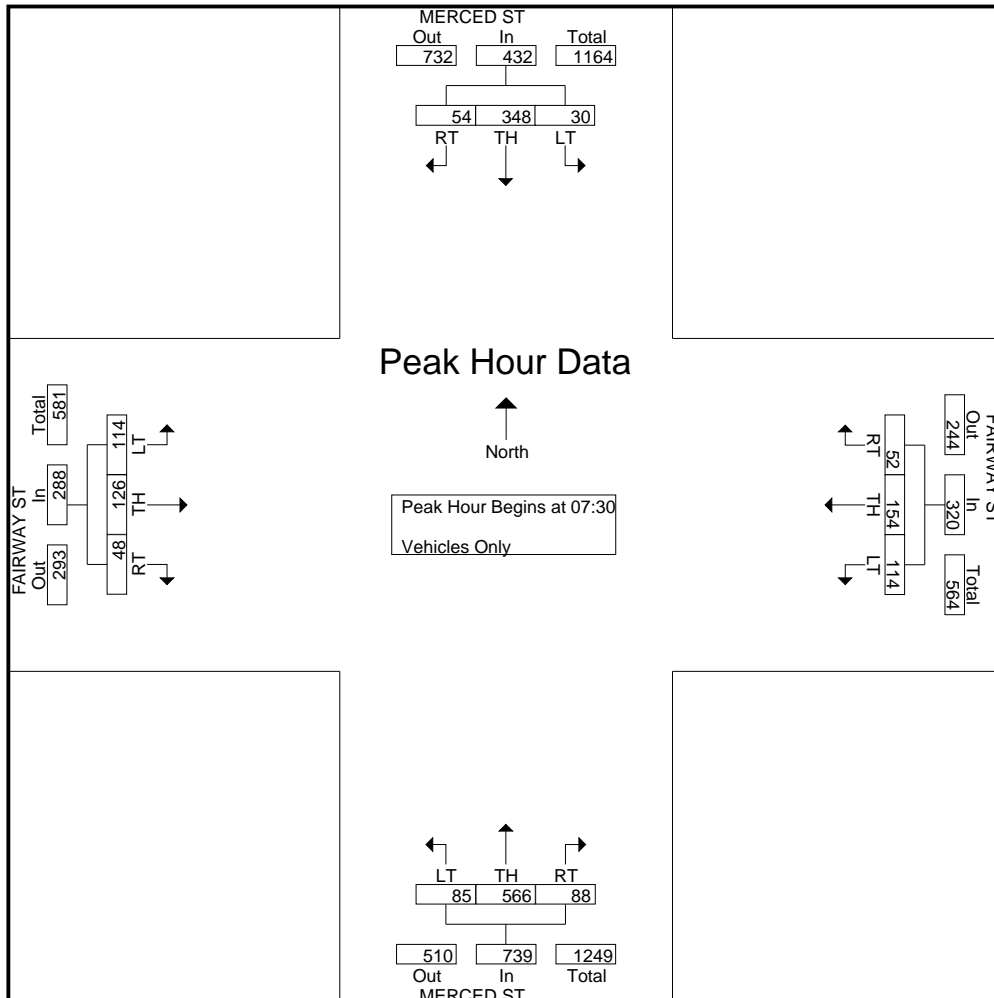
| Start Time | MERCED ST Southbound | | | | FAIRWAY ST Westbound | | | | MERCED ST Northbound | | | | FAIRWAY ST Eastbound | | | | Int. Total |
|--------------------|-------------------------|------------|-----------|------------|-------------------------|------------|------------|------------|-------------------------|------------|------------|-------------|-------------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 16 | 64 | 9 | 89 | 9 | 21 | 19 | 49 | 9 | 89 | 12 | 110 | 3 | 14 | 15 | 32 | 280 |
| 07:15 | 26 | 66 | 12 | 104 | 19 | 33 | 10 | 62 | 12 | 125 | 10 | 147 | 4 | 23 | 28 | 55 | 368 |
| 07:30 | 13 | 79 | 5 | 97 | 9 | 25 | 22 | 56 | 17 | 129 | 12 | 158 | 4 | 35 | 31 | 70 | 381 |
| 07:45 | 11 | 99 | 12 | 122 | 12 | 45 | 34 | 91 | 26 | 138 | 27 | 191 | 17 | 31 | 25 | 73 | 477 |
| Total | 66 | 308 | 38 | 412 | 49 | 124 | 85 | 258 | 64 | 481 | 61 | 606 | 28 | 103 | 99 | 230 | 1506 |
| 08:00 | 12 | 95 | 6 | 113 | 13 | 48 | 30 | 91 | 19 | 160 | 28 | 207 | 16 | 29 | 28 | 73 | 484 |
| 08:15 | 18 | 75 | 7 | 100 | 18 | 36 | 28 | 82 | 26 | 139 | 18 | 183 | 11 | 31 | 30 | 72 | 437 |
| 08:30 | 19 | 75 | 6 | 100 | 12 | 24 | 19 | 55 | 10 | 96 | 18 | 124 | 8 | 28 | 24 | 60 | 339 |
| 08:45 | 14 | 78 | 15 | 107 | 14 | 24 | 9 | 47 | 18 | 104 | 22 | 144 | 9 | 36 | 27 | 72 | 370 |
| Total | 63 | 323 | 34 | 420 | 57 | 132 | 86 | 275 | 73 | 499 | 86 | 658 | 44 | 124 | 109 | 277 | 1630 |
| Grand Total | 129 | 631 | 72 | 832 | 106 | 256 | 171 | 533 | 137 | 980 | 147 | 1264 | 72 | 227 | 208 | 507 | 3136 |
| Apprch % | 15.5 | 75.8 | 8.7 | | 19.9 | 48 | 32.1 | | 10.8 | 77.5 | 11.6 | | 14.2 | 44.8 | 41 | | |
| Total % | 4.1 | 20.1 | 2.3 | 26.5 | 3.4 | 8.2 | 5.5 | 17 | 4.4 | 31.2 | 4.7 | 40.3 | 2.3 | 7.2 | 6.6 | 16.2 | |

| Start Time | MERCED ST Southbound | | | | FAIRWAY ST Westbound | | | | MERCED ST Northbound | | | | FAIRWAY ST Eastbound | | | | Int. Total |
|------------|-------------------------|----|----|------------|-------------------------|----|----|------------|-------------------------|----|----|------------|-------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30

| | | | | | | | | | | | | | | | | | |
|--------------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|------------|-----------|-----------|-----------|-----------|------------|
| 07:30 | 13 | 79 | 5 | 97 | 9 | 25 | 22 | 56 | 17 | 129 | 12 | 158 | 4 | 35 | 31 | 70 | 381 |
| 07:45 | 11 | 99 | 12 | 122 | 12 | 45 | 34 | 91 | 26 | 138 | 27 | 191 | 17 | 31 | 25 | 73 | 477 |
| 08:00 | 12 | 95 | 6 | 113 | 13 | 48 | 30 | 91 | 19 | 160 | 28 | 207 | 16 | 29 | 28 | 73 | 484 |
| 08:15 | 18 | 75 | 7 | 100 | 18 | 36 | 28 | 82 | 26 | 139 | 18 | 183 | 11 | 31 | 30 | 72 | 437 |
| Total Volume | 54 | 348 | 30 | 432 | 52 | 154 | 114 | 320 | 88 | 566 | 85 | 739 | 48 | 126 | 114 | 288 | 1779 |
| % App. Total | 12.5 | 80.6 | 6.9 | | 16.2 | 48.1 | 35.6 | | 11.9 | 76.6 | 11.5 | | 16.7 | 43.8 | 39.6 | | |
| PHF | .750 | .879 | .625 | .885 | .722 | .802 | .838 | .879 | .846 | .884 | .759 | .893 | .706 | .900 | .919 | .986 | .919 |



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-fairway-p
Site Code : 15
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

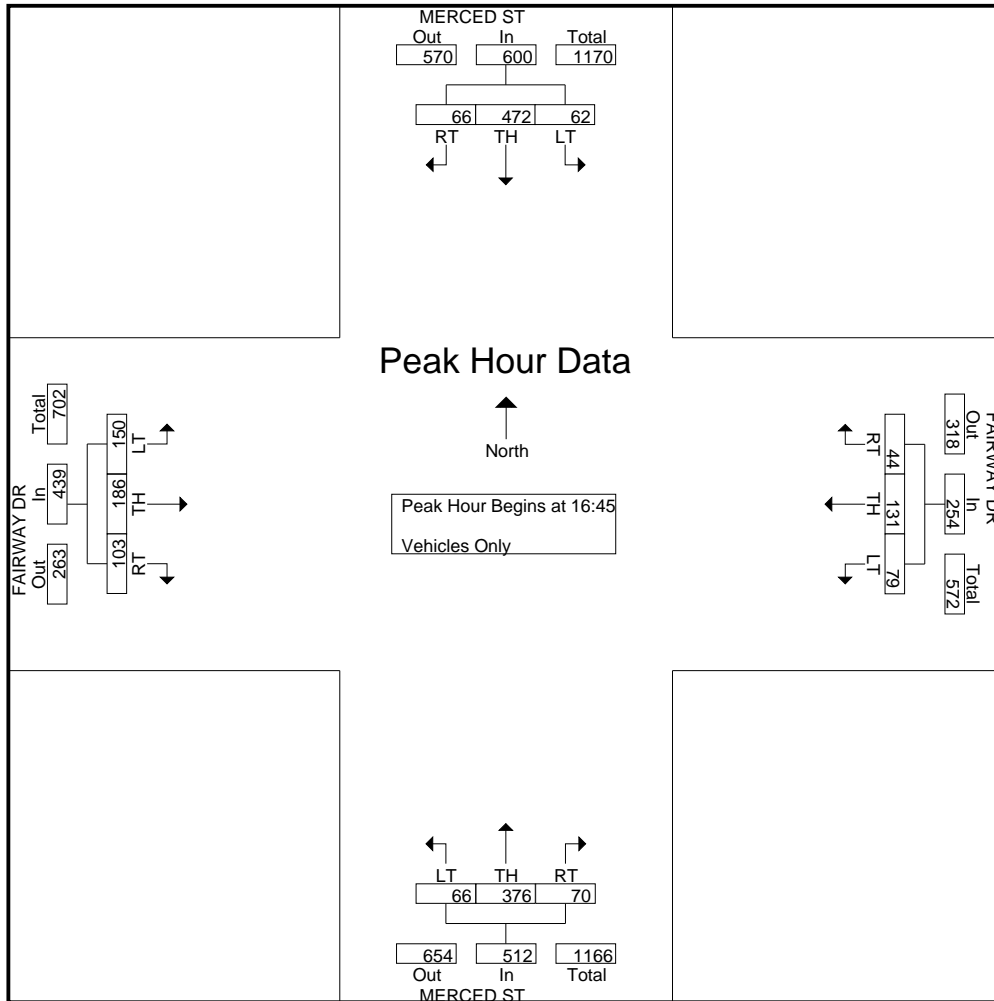
| Start Time | MERCED ST Southbound | | | | FAIRWAY DR Westbound | | | | MERCED ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|-------------------------|------------|------------|-------------|-------------------------|------------|------------|------------|-------------------------|------------|------------|-------------|-------------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 15 | 107 | 11 | 133 | 15 | 24 | 18 | 57 | 15 | 116 | 17 | 148 | 14 | 55 | 49 | 118 | 456 |
| 16:15 | 11 | 107 | 11 | 129 | 14 | 32 | 11 | 57 | 18 | 92 | 19 | 129 | 19 | 39 | 39 | 97 | 412 |
| 16:30 | 22 | 82 | 11 | 115 | 16 | 37 | 21 | 74 | 17 | 99 | 20 | 136 | 22 | 29 | 32 | 83 | 408 |
| 16:45 | 18 | 106 | 14 | 138 | 7 | 26 | 18 | 51 | 20 | 98 | 17 | 135 | 24 | 35 | 32 | 91 | 415 |
| Total | 66 | 402 | 47 | 515 | 52 | 119 | 68 | 239 | 70 | 405 | 73 | 548 | 79 | 158 | 152 | 389 | 1691 |
| 17:00 | 11 | 114 | 16 | 141 | 13 | 37 | 23 | 73 | 22 | 117 | 13 | 152 | 29 | 56 | 45 | 130 | 496 |
| 17:15 | 17 | 130 | 18 | 165 | 14 | 34 | 25 | 73 | 14 | 84 | 20 | 118 | 25 | 50 | 29 | 104 | 460 |
| 17:30 | 20 | 122 | 14 | 156 | 10 | 34 | 13 | 57 | 14 | 77 | 16 | 107 | 25 | 45 | 44 | 114 | 434 |
| 17:45 | 13 | 123 | 8 | 144 | 11 | 34 | 15 | 60 | 12 | 80 | 10 | 102 | 17 | 46 | 35 | 98 | 404 |
| Total | 61 | 489 | 56 | 606 | 48 | 139 | 76 | 263 | 62 | 358 | 59 | 479 | 96 | 197 | 153 | 446 | 1794 |
| Grand Total | 127 | 891 | 103 | 1121 | 100 | 258 | 144 | 502 | 132 | 763 | 132 | 1027 | 175 | 355 | 305 | 835 | 3485 |
| Apprch % | 11.3 | 79.5 | 9.2 | | 19.9 | 51.4 | 28.7 | | 12.9 | 74.3 | 12.9 | | 21 | 42.5 | 36.5 | | |
| Total % | 3.6 | 25.6 | 3 | 32.2 | 2.9 | 7.4 | 4.1 | 14.4 | 3.8 | 21.9 | 3.8 | 29.5 | 5 | 10.2 | 8.8 | 24 | |

| Start Time | MERCED ST Southbound | | | | FAIRWAY DR Westbound | | | | MERCED ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|------------|-------------------------|----|----|------------|-------------------------|----|----|------------|-------------------------|----|----|------------|-------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:45

| | | | | | | | | | | | | | | | | | |
|---------------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|------------|------------|------------|------------|-------------|
| 16:45 | 18 | 106 | 14 | 138 | 7 | 26 | 18 | 51 | 20 | 98 | 17 | 135 | 24 | 35 | 32 | 91 | 415 |
| 17:00 | 11 | 114 | 16 | 141 | 13 | 37 | 23 | 73 | 22 | 117 | 13 | 152 | 29 | 56 | 45 | 130 | 496 |
| 17:15 | 17 | 130 | 18 | 165 | 14 | 34 | 25 | 73 | 14 | 84 | 20 | 118 | 25 | 50 | 29 | 104 | 460 |
| 17:30 | 20 | 122 | 14 | 156 | 10 | 34 | 13 | 57 | 14 | 77 | 16 | 107 | 25 | 45 | 44 | 114 | 434 |
| Total Volume | 66 | 472 | 62 | 600 | 44 | 131 | 79 | 254 | 70 | 376 | 66 | 512 | 103 | 186 | 150 | 439 | 1805 |
| % App. Total | 11 | 78.7 | 10.3 | | 17.3 | 51.6 | 31.1 | | 13.7 | 73.4 | 12.9 | | 23.5 | 42.4 | 34.2 | | |
| PHF | .825 | .908 | .861 | .909 | .786 | .885 | .790 | .870 | .795 | .803 | .825 | .842 | .888 | .830 | .833 | .844 | .910 |



MARKS TRAFFIC DATA

mietekm@comcast.net
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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-fairway-s
Site Code : 15
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MERCED ST Southbound | | | | | FAIRWAY DR Westbound | | | | MERCED ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|----------------------|-------------|------------|-----------|-------------|----------------------|------------|------------|------------|----------------------|-------------|------------|-------------|----------------------|------------|------------|-------------|-------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 15 | 67 | 9 | 1 | 92 | 7 | 25 | 9 | 41 | 8 | 91 | 10 | 109 | 9 | 25 | 28 | 62 | 304 |
| 10:15 | 15 | 69 | 8 | 1 | 93 | 4 | 13 | 11 | 28 | 12 | 103 | 12 | 127 | 11 | 25 | 16 | 52 | 300 |
| 10:30 | 8 | 53 | 5 | 1 | 67 | 3 | 24 | 9 | 36 | 9 | 108 | 11 | 128 | 10 | 29 | 20 | 59 | 290 |
| 10:45 | 14 | 86 | 7 | 0 | 107 | 8 | 28 | 14 | 50 | 8 | 96 | 10 | 114 | 12 | 31 | 16 | 59 | 330 |
| Total | 52 | 275 | 29 | 3 | 359 | 22 | 90 | 43 | 155 | 37 | 398 | 43 | 478 | 42 | 110 | 80 | 232 | 1224 |
| 11:00 | 16 | 85 | 9 | 2 | 112 | 9 | 32 | 11 | 52 | 12 | 109 | 15 | 136 | 13 | 21 | 24 | 58 | 358 |
| 11:15 | 19 | 81 | 7 | 1 | 108 | 6 | 16 | 9 | 31 | 9 | 90 | 12 | 111 | 20 | 32 | 24 | 76 | 326 |
| 11:30 | 10 | 66 | 6 | 2 | 84 | 9 | 26 | 8 | 43 | 13 | 90 | 7 | 110 | 11 | 30 | 29 | 70 | 307 |
| 11:45 | 21 | 93 | 10 | 1 | 125 | 9 | 27 | 18 | 54 | 10 | 92 | 15 | 117 | 8 | 30 | 29 | 67 | 363 |
| Total | 66 | 325 | 32 | 6 | 429 | 33 | 101 | 46 | 180 | 44 | 381 | 49 | 474 | 52 | 113 | 106 | 271 | 1354 |
| 12:00 | 14 | 74 | 5 | 2 | 95 | 6 | 27 | 11 | 44 | 12 | 114 | 14 | 140 | 12 | 27 | 30 | 69 | 348 |
| 12:15 | 13 | 88 | 9 | 0 | 110 | 12 | 29 | 8 | 49 | 11 | 101 | 14 | 126 | 9 | 33 | 18 | 60 | 345 |
| 12:30 | 21 | 71 | 9 | 2 | 103 | 11 | 20 | 16 | 47 | 13 | 101 | 11 | 125 | 8 | 22 | 30 | 60 | 335 |
| 12:45 | 14 | 80 | 7 | 0 | 101 | 12 | 34 | 14 | 60 | 12 | 105 | 5 | 122 | 21 | 30 | 28 | 79 | 362 |
| Total | 62 | 313 | 30 | 4 | 409 | 41 | 110 | 49 | 200 | 48 | 421 | 44 | 513 | 50 | 112 | 106 | 268 | 1390 |
| 13:00 | 23 | 91 | 5 | 0 | 119 | 18 | 26 | 14 | 58 | 9 | 74 | 8 | 91 | 10 | 34 | 33 | 77 | 345 |
| 13:15 | 8 | 97 | 9 | 2 | 116 | 12 | 28 | 12 | 52 | 12 | 95 | 16 | 123 | 19 | 30 | 19 | 68 | 359 |
| 13:30 | 13 | 82 | 10 | 0 | 105 | 11 | 28 | 10 | 49 | 9 | 114 | 12 | 135 | 16 | 24 | 25 | 65 | 354 |
| 13:45 | 11 | 90 | 5 | 0 | 106 | 8 | 28 | 11 | 47 | 8 | 61 | 6 | 75 | 9 | 33 | 20 | 62 | 290 |
| Total | 55 | 360 | 29 | 2 | 446 | 49 | 110 | 47 | 206 | 38 | 344 | 42 | 424 | 54 | 121 | 97 | 272 | 1348 |
| Grand Total | 235 | 1273 | 120 | 15 | 1643 | 145 | 411 | 185 | 741 | 167 | 1544 | 178 | 1889 | 198 | 456 | 389 | 1043 | 5316 |
| Apprch % | 14.3 | 77.5 | 7.3 | 0.9 | | 19.6 | 55.5 | 25 | | 8.8 | 81.7 | 9.4 | | 19 | 43.7 | 37.3 | | |
| Total % | 4.4 | 23.9 | 2.3 | 0.3 | 30.9 | 2.7 | 7.7 | 3.5 | 13.9 | 3.1 | 29 | 3.3 | 35.5 | 3.7 | 8.6 | 7.3 | 19.6 | |

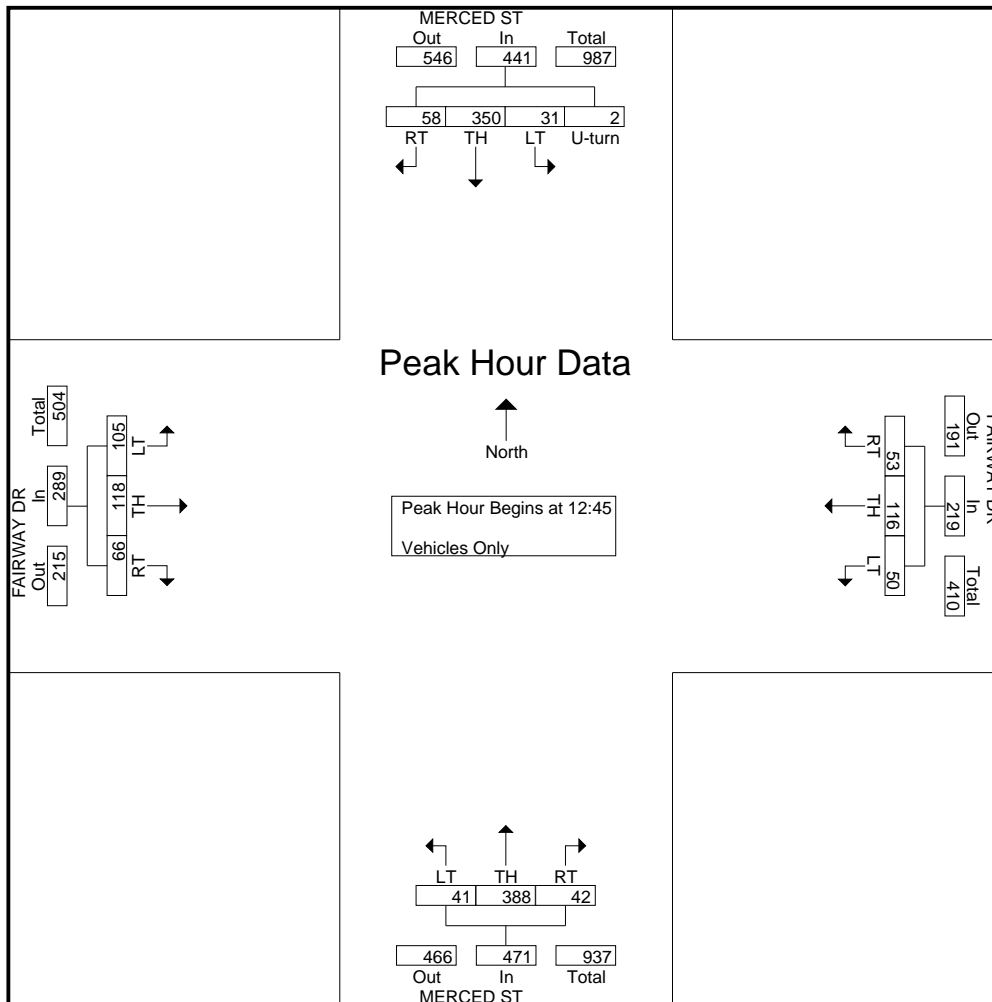
| Start Time | MERCED ST Southbound | | | | | FAIRWAY DR Westbound | | | | MERCED ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--|----------------------|-----------|-----------|--------|------------|----------------------|-----------|-----------|------------|----------------------|------------|-----------|------------|----------------------|-----------|-----------|------------|------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:45 | | | | | | | | | | | | | | | | | | |
| 12:45 | 14 | 80 | 7 | 0 | 101 | 12 | 34 | 14 | 60 | 12 | 105 | 5 | 122 | 21 | 30 | 28 | 79 | 362 |
| 13:00 | 23 | 91 | 5 | 0 | 119 | 18 | 26 | 14 | 58 | 9 | 74 | 8 | 91 | 10 | 34 | 33 | 77 | 345 |
| 13:15 | 8 | 97 | 9 | 2 | 116 | 12 | 28 | 12 | 52 | 12 | 95 | 16 | 123 | 19 | 30 | 19 | 68 | 359 |
| 13:30 | 13 | 82 | 10 | 0 | 105 | 11 | 28 | 10 | 49 | 9 | 114 | 12 | 135 | 16 | 24 | 25 | 65 | 354 |
| Total Volume | 58 | 350 | 31 | 2 | 441 | 53 | 116 | 50 | 219 | 42 | 388 | 41 | 471 | 66 | 118 | 105 | 289 | 1420 |
| % App. Total | 13.2 | 79.4 | 7 | 0.5 | | 24.2 | 53 | 22.8 | | 8.9 | 82.4 | 8.7 | | 22.8 | 40.8 | 36.3 | | |
| PHF | .630 | .902 | .775 | .250 | .926 | .736 | .853 | .893 | .913 | .875 | .851 | .641 | .872 | .786 | .868 | .795 | .915 | .981 |

MARKS TRAFFIC DATA

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916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-fairway-s
Site Code : 15
Start Date : 2/2/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO

File Name : garfield-fairway-a
Site Code : 1
Start Date : 6/12/2013
Page No : 1

Groups Printed- Vehicles Only

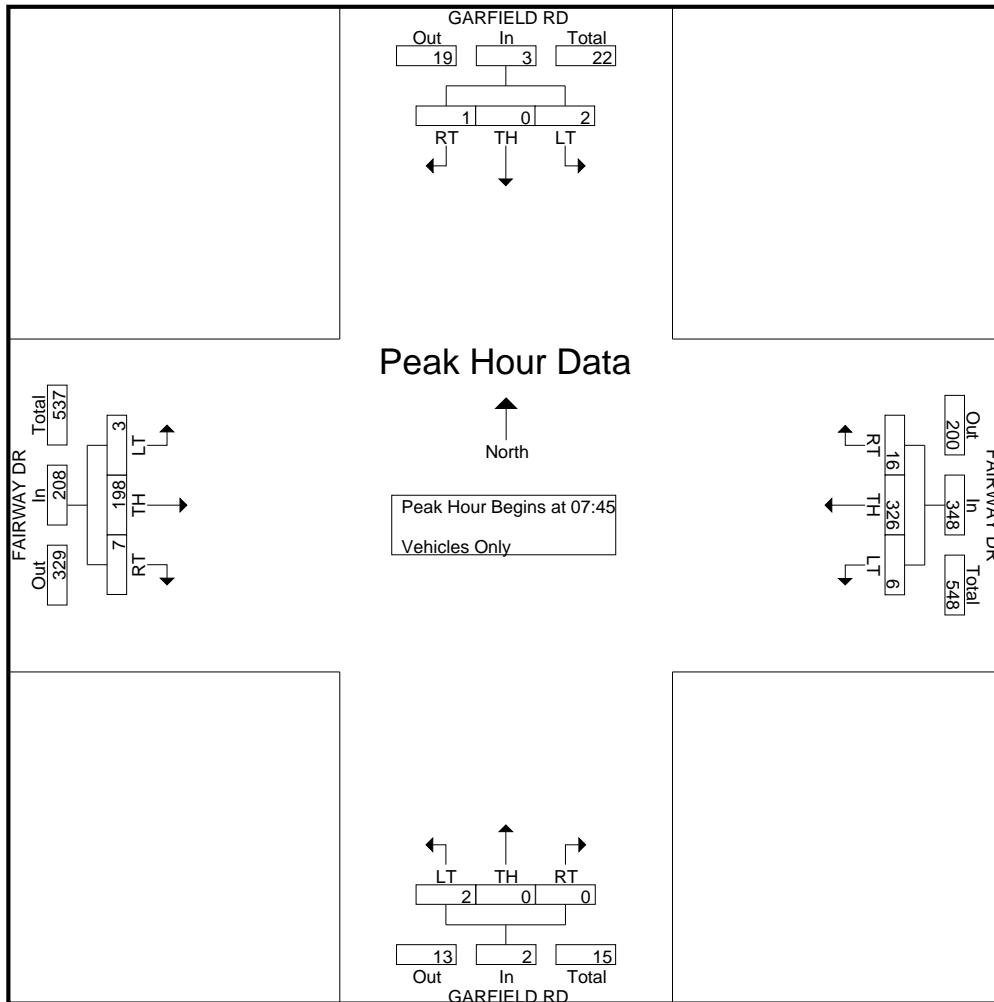
| Start Time | GARFIELD RD Southbound | | | | FAIRWAY DR Westbound | | | | GARFIELD RD Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|------------------------|----------|----------|------------|----------------------|------------|-----------|------------|------------------------|----------|----------|------------|----------------------|------------|----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 0 | 0 | 0 | 0 | 12 | 42 | 2 | 56 | 0 | 0 | 3 | 3 | 0 | 30 | 0 | 30 | 89 |
| 07:15 | 0 | 0 | 0 | 0 | 10 | 62 | 1 | 73 | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 58 | 131 |
| 07:30 | 1 | 0 | 0 | 1 | 5 | 68 | 3 | 76 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 44 | 121 |
| 07:45 | 0 | 0 | 1 | 1 | 2 | 84 | 1 | 87 | 0 | 0 | 0 | 0 | 0 | 51 | 0 | 51 | 139 |
| Total | 1 | 0 | 1 | 2 | 29 | 256 | 7 | 292 | 0 | 0 | 3 | 3 | 0 | 183 | 0 | 183 | 480 |
| 08:00 | 0 | 0 | 0 | 0 | 4 | 86 | 3 | 93 | 0 | 0 | 1 | 1 | 0 | 52 | 1 | 53 | 147 |
| 08:15 | 0 | 0 | 0 | 0 | 4 | 80 | 0 | 84 | 0 | 0 | 0 | 0 | 4 | 51 | 2 | 57 | 141 |
| 08:30 | 1 | 0 | 1 | 2 | 6 | 76 | 2 | 84 | 0 | 0 | 1 | 1 | 3 | 44 | 0 | 47 | 134 |
| 08:45 | 1 | 0 | 0 | 1 | 1 | 56 | 2 | 59 | 0 | 0 | 1 | 1 | 3 | 37 | 1 | 41 | 102 |
| Total | 2 | 0 | 1 | 3 | 15 | 298 | 7 | 320 | 0 | 0 | 3 | 3 | 10 | 184 | 4 | 198 | 524 |
| Grand Total | 3 | 0 | 2 | 5 | 44 | 554 | 14 | 612 | 0 | 0 | 6 | 6 | 10 | 367 | 4 | 381 | 1004 |
| Apprch % | 60 | 0 | 40 | | 7.2 | 90.5 | 2.3 | | 0 | 0 | 100 | | 2.6 | 96.3 | 1 | | |
| Total % | 0.3 | 0 | 0.2 | 0.5 | 4.4 | 55.2 | 1.4 | 61 | 0 | 0 | 0.6 | 0.6 | 1 | 36.6 | 0.4 | 37.9 | |

| Start Time | GARFIELD RD Southbound | | | | FAIRWAY DR Westbound | | | | GARFIELD RD Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|------------|------------------------|----|----|------------|----------------------|----|----|------------|------------------------|----|----|------------|----------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:45

| | | | | | | | | | | | | | | | | | |
|---------------------|----------|----------|----------|----------|-----------|------------|----------|------------|----------|----------|----------|----------|----------|------------|----------|------------|------------|
| 07:45 | 0 | 0 | 1 | 1 | 2 | 84 | 1 | 87 | 0 | 0 | 0 | 0 | 0 | 51 | 0 | 51 | 139 |
| 08:00 | 0 | 0 | 0 | 0 | 4 | 86 | 3 | 93 | 0 | 0 | 1 | 1 | 0 | 52 | 1 | 53 | 147 |
| 08:15 | 0 | 0 | 0 | 0 | 4 | 80 | 0 | 84 | 0 | 0 | 0 | 0 | 4 | 51 | 2 | 57 | 141 |
| 08:30 | 1 | 0 | 1 | 2 | 6 | 76 | 2 | 84 | 0 | 0 | 1 | 1 | 3 | 44 | 0 | 47 | 134 |
| Total Volume | 1 | 0 | 2 | 3 | 16 | 326 | 6 | 348 | 0 | 0 | 2 | 2 | 7 | 198 | 3 | 208 | 561 |
| % App. Total | 33.3 | 0 | 66.7 | | 4.6 | 93.7 | 1.7 | | 0 | 0 | 100 | | 3.4 | 95.2 | 1.4 | | |
| PHF | .250 | .000 | .500 | .375 | .667 | .948 | .500 | .935 | .000 | .000 | .500 | .500 | .438 | .952 | .375 | .912 | .954 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO

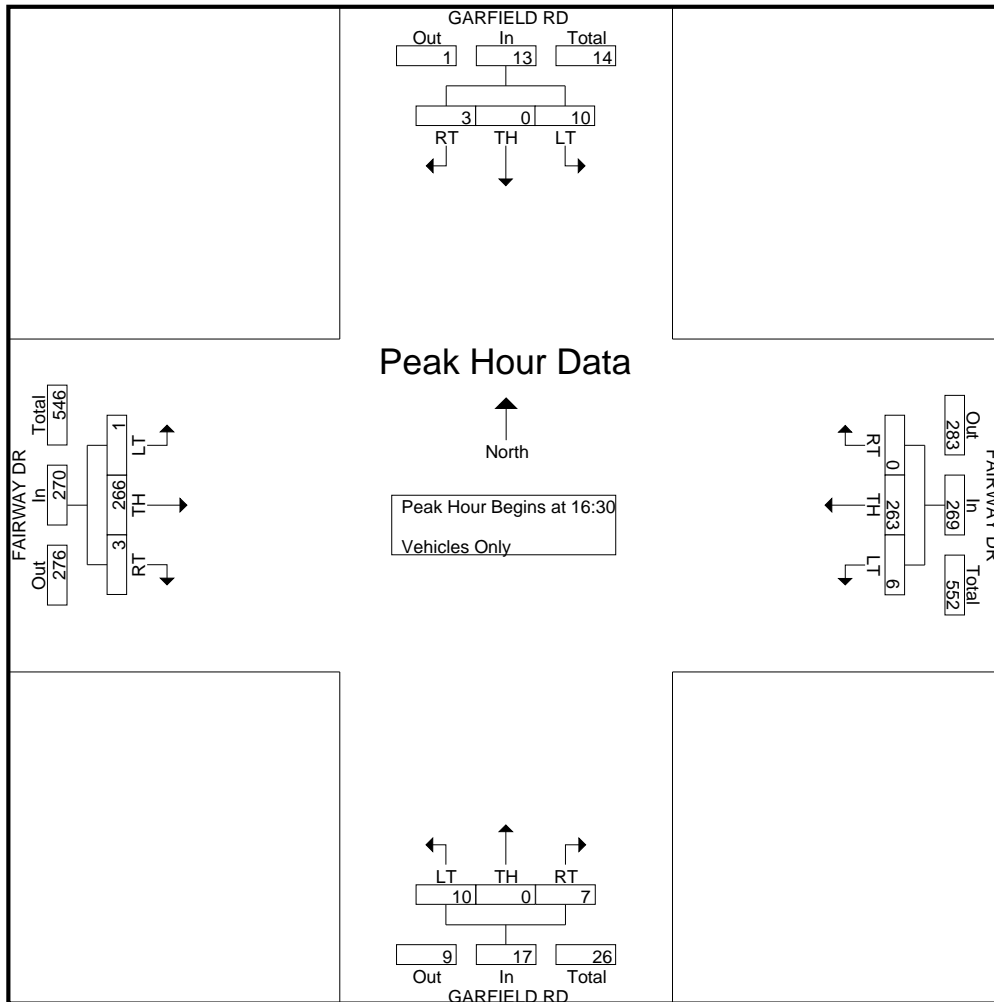
File Name : garfield-fairway-p
Site Code : 1
Start Date : 6/12/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | GARFIELD RD Southbound | | | | FAIRWAY DR Westbound | | | | GARFIELD RD Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|------------------------|----------|-----------|------------|----------------------|------------|----------|------------|------------------------|----------|-----------|------------|----------------------|------------|----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 1 | 0 | 2 | 3 | 0 | 61 | 0 | 61 | 0 | 0 | 2 | 2 | 2 | 58 | 0 | 60 | 126 |
| 16:15 | 0 | 0 | 2 | 2 | 0 | 62 | 1 | 63 | 2 | 0 | 7 | 9 | 1 | 45 | 0 | 46 | 120 |
| 16:30 | 0 | 0 | 4 | 4 | 0 | 69 | 1 | 70 | 4 | 0 | 2 | 6 | 0 | 65 | 0 | 65 | 145 |
| 16:45 | 1 | 0 | 1 | 2 | 0 | 42 | 3 | 45 | 1 | 0 | 2 | 3 | 0 | 60 | 0 | 60 | 110 |
| Total | 2 | 0 | 9 | 11 | 0 | 234 | 5 | 239 | 7 | 0 | 13 | 20 | 3 | 228 | 0 | 231 | 501 |
| 17:00 | 2 | 0 | 1 | 3 | 0 | 78 | 1 | 79 | 1 | 0 | 5 | 6 | 0 | 68 | 1 | 69 | 157 |
| 17:15 | 0 | 0 | 4 | 4 | 0 | 74 | 1 | 75 | 1 | 0 | 1 | 2 | 3 | 73 | 0 | 76 | 157 |
| 17:30 | 0 | 0 | 1 | 1 | 0 | 66 | 2 | 68 | 1 | 0 | 0 | 1 | 2 | 52 | 1 | 55 | 125 |
| 17:45 | 1 | 0 | 2 | 3 | 0 | 53 | 0 | 53 | 0 | 0 | 1 | 1 | 3 | 65 | 0 | 68 | 125 |
| Total | 3 | 0 | 8 | 11 | 0 | 271 | 4 | 275 | 3 | 0 | 7 | 10 | 8 | 258 | 2 | 268 | 564 |
| Grand Total | 5 | 0 | 17 | 22 | 0 | 505 | 9 | 514 | 10 | 0 | 20 | 30 | 11 | 486 | 2 | 499 | 1065 |
| Apprch % | 22.7 | 0 | 77.3 | | 0 | 98.2 | 1.8 | | 33.3 | 0 | 66.7 | | 2.2 | 97.4 | 0.4 | | |
| Total % | 0.5 | 0 | 1.6 | 2.1 | 0 | 47.4 | 0.8 | 48.3 | 0.9 | 0 | 1.9 | 2.8 | 1 | 45.6 | 0.2 | 46.9 | |

| Start Time | GARFIELD RD Southbound | | | | FAIRWAY DR Westbound | | | | GARFIELD RD Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|---------------------|------------------------|----------|-----------|------------|----------------------|------------|----------|------------|------------------------|----------|-----------|------------|----------------------|------------|----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:30 | 0 | 0 | 4 | 4 | 0 | 69 | 1 | 70 | 4 | 0 | 2 | 6 | 0 | 65 | 0 | 65 | 145 |
| 16:45 | 1 | 0 | 1 | 2 | 0 | 42 | 3 | 45 | 1 | 0 | 2 | 3 | 0 | 60 | 0 | 60 | 110 |
| 17:00 | 2 | 0 | 1 | 3 | 0 | 78 | 1 | 79 | 1 | 0 | 5 | 6 | 0 | 68 | 1 | 69 | 157 |
| 17:15 | 0 | 0 | 4 | 4 | 0 | 74 | 1 | 75 | 1 | 0 | 1 | 2 | 3 | 73 | 0 | 76 | 157 |
| Total Volume | 3 | 0 | 10 | 13 | 0 | 263 | 6 | 269 | 7 | 0 | 10 | 17 | 3 | 266 | 1 | 270 | 569 |
| % App. Total | 23.1 | 0 | 76.9 | | 0 | 97.8 | 2.2 | | 41.2 | 0 | 58.8 | | 1.1 | 98.5 | 0.4 | | |
| PHF | .375 | .000 | .625 | .813 | .000 | .843 | .500 | .851 | .438 | .000 | .500 | .708 | .250 | .911 | .250 | .888 | .906 |

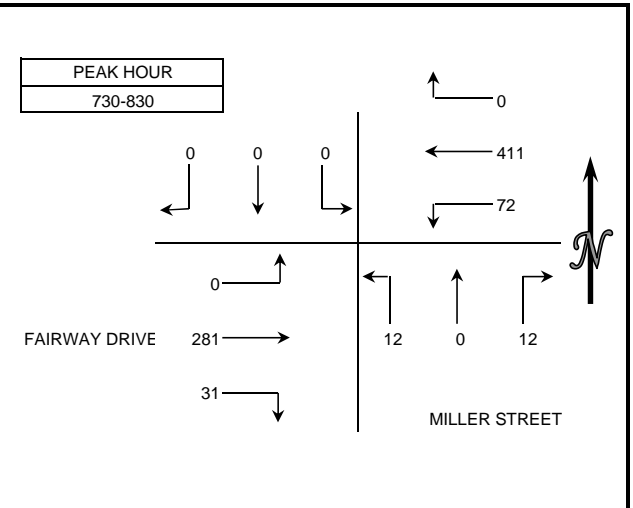
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:30



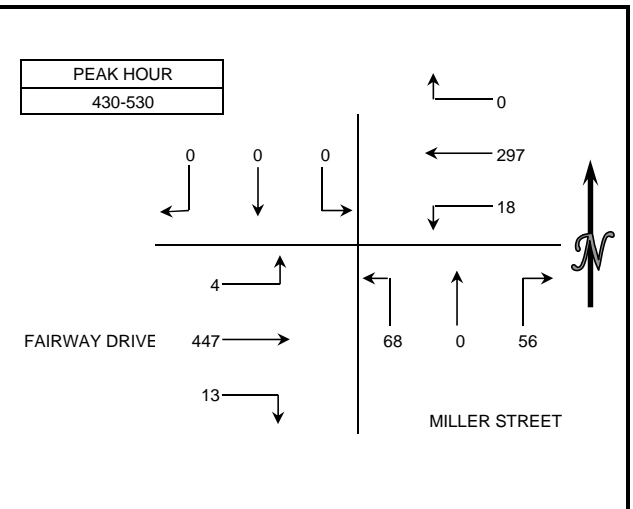
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: PBS&J
 PROJECT: SAN LEANDRO TRAFFIC COUNTS
 DATE: WEDNESDAY, JUNE 6, 2007
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
 INTERSECTION: N/S MILLER STREET
 E/W FAIRWAY DRIVE
 CITY: SAN LEANDRO

| 15 MIN COUNTS | | | | | | | | | | | | | | 7:00 AM TO 9:00 AM | | | | | | | | | | | | | |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|-------|--------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL | | | | | | | | | | | | | | |
| 700-715 | 0 | 0 | 0 | 0 | 44 | 17 | 3 | 0 | 6 | 8 | 41 | 0 | 119 | | | | | | | | | | | | | | |
| 715-730 | 0 | 0 | 0 | 0 | 62 | 18 | 2 | 0 | 5 | 2 | 52 | 0 | 141 | | | | | | | | | | | | | | |
| 730-745 | 0 | 0 | 0 | 0 | 88 | 22 | 3 | 0 | 2 | 9 | 79 | 0 | 203 | | | | | | | | | | | | | | |
| 745-800 | 0 | 0 | 0 | 0 | 118 | 23 | 3 | 0 | 3 | 10 | 80 | 0 | 237 | | | | | | | | | | | | | | |
| 800-815 | 0 | 0 | 0 | 0 | 107 | 11 | 4 | 0 | 2 | 10 | 65 | 0 | 199 | | | | | | | | | | | | | | |
| 815-830 | 0 | 0 | 0 | 0 | 98 | 16 | 2 | 0 | 5 | 2 | 57 | 0 | 180 | | | | | | | | | | | | | | |
| 830-845 | 0 | 0 | 0 | 0 | 76 | 12 | 2 | 0 | 6 | 10 | 77 | 0 | 183 | | | | | | | | | | | | | | |
| 845-900 | 0 | 0 | 0 | 0 | 66 | 10 | 2 | 0 | 5 | -55 | 51 | 0 | 79 | | | | | | | | | | | | | | |
| HOUR TOTALS | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL | | | | | | | | | | | | | | |
| 700-800 | 0 | 0 | 0 | 0 | 312 | 80 | 11 | 0 | 16 | 29 | 252 | 0 | 700 | | | | | | | | | | | | | | |
| 715-815 | 0 | 0 | 0 | 0 | 375 | 74 | 12 | 0 | 12 | 31 | 276 | 0 | 780 | | | | | | | | | | | | | | |
| 730-830 | 0 | 0 | 0 | 0 | 411 | 72 | 12 | 0 | 12 | 31 | 281 | 0 | 819 | | | | | | | | | | | | | | |
| 745-845 | 0 | 0 | 0 | 0 | 399 | 62 | 11 | 0 | 16 | 32 | 279 | 0 | 799 | | | | | | | | | | | | | | |
| 800-900 | 0 | 0 | 0 | 0 | 347 | 49 | 10 | 0 | 18 | -33 | 250 | 0 | 641 | | | | | | | | | | | | | | |



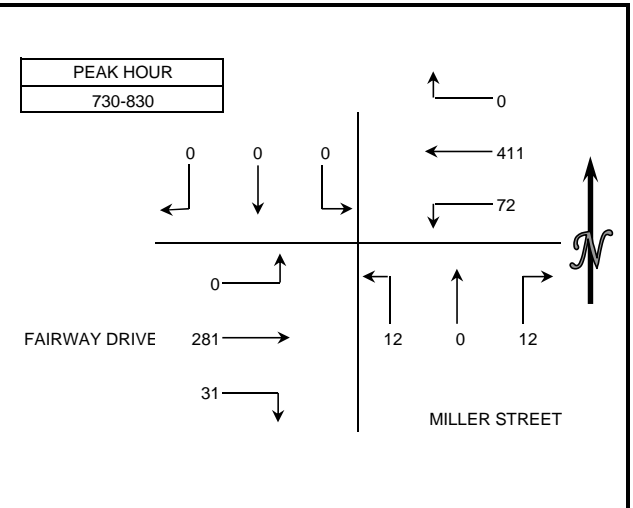
| 15 MIN COUNTS | | | | | | | | | | | | | | 4:00 PM TO 6:00 PM | | | | | | | | | | | | | |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|-------|--------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL | | | | | | | | | | | | | | |
| 400-415 | 0 | 0 | 0 | 0 | 66 | 11 | 16 | 0 | 14 | 8 | 116 | 0 | 231 | | | | | | | | | | | | | | |
| 415-430 | 0 | 0 | 0 | 0 | 60 | 12 | 2 | 0 | 10 | 4 | 97 | 0 | 185 | | | | | | | | | | | | | | |
| 430-445 | 0 | 0 | 0 | 0 | 70 | 5 | 22 | 0 | 30 | 6 | 126 | 2 | 261 | | | | | | | | | | | | | | |
| 445-500 | 0 | 0 | 0 | 0 | 66 | 6 | 9 | 0 | 17 | 2 | 107 | 2 | 209 | | | | | | | | | | | | | | |
| 500-515 | 0 | 0 | 0 | 0 | 71 | 3 | 19 | 0 | 12 | 2 | 91 | 0 | 198 | | | | | | | | | | | | | | |
| 515-530 | 0 | 0 | 0 | 0 | 90 | 4 | 6 | 0 | 9 | 3 | 123 | 0 | 235 | | | | | | | | | | | | | | |
| 530-545 | 0 | 0 | 0 | 0 | 70 | 4 | 8 | 0 | 14 | 2 | 92 | 0 | 190 | | | | | | | | | | | | | | |
| 545-600 | 0 | 0 | 0 | 0 | 53 | 2 | 5 | 0 | 6 | 1 | 72 | 0 | 139 | | | | | | | | | | | | | | |
| HOUR TOTALS | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL | | | | | | | | | | | | | | |
| 400-500 | 0 | 0 | 0 | 0 | 262 | 34 | 49 | 0 | 71 | 20 | 446 | 4 | 886 | | | | | | | | | | | | | | |
| 415-515 | 0 | 0 | 0 | 0 | 267 | 26 | 52 | 0 | 69 | 14 | 421 | 4 | 853 | | | | | | | | | | | | | | |
| 430-530 | 0 | 0 | 0 | 0 | 297 | 18 | 56 | 0 | 68 | 13 | 447 | 4 | 903 | | | | | | | | | | | | | | |
| 445-545 | 0 | 0 | 0 | 0 | 297 | 17 | 42 | 0 | 52 | 9 | 413 | 2 | 832 | | | | | | | | | | | | | | |
| 500-600 | 0 | 0 | 0 | 0 | 284 | 13 | 38 | 0 | 41 | 8 | 378 | 0 | 762 | | | | | | | | | | | | | | |



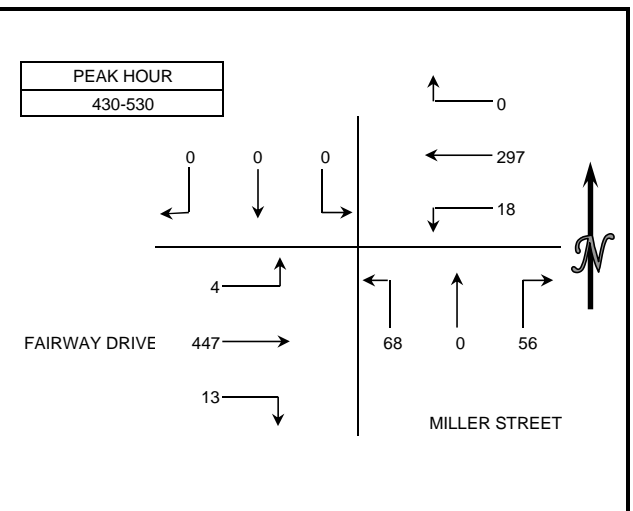
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: PBS&J
 PROJECT: SAN LEANDRO TRAFFIC COUNTS
 DATE: WEDNESDAY, JUNE 6, 2007
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
 INTERSECTION: N/S MILLER STREET
 E/W FAIRWAY DRIVE
 CITY: SAN LEANDRO

| 15 MIN COUNTS | | | | | | | | | | | | | | 7:00 AM TO 9:00 AM | | | | | | | | | | | | | |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|-------|--------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL | | | | | | | | | | | | | | |
| 700-715 | 0 | 0 | 0 | 0 | 44 | 17 | 3 | 0 | 6 | 8 | 41 | 0 | 119 | | | | | | | | | | | | | | |
| 715-730 | 0 | 0 | 0 | 0 | 62 | 18 | 2 | 0 | 5 | 2 | 52 | 0 | 141 | | | | | | | | | | | | | | |
| 730-745 | 0 | 0 | 0 | 0 | 88 | 22 | 3 | 0 | 2 | 9 | 79 | 0 | 203 | | | | | | | | | | | | | | |
| 745-800 | 0 | 0 | 0 | 0 | 118 | 23 | 3 | 0 | 3 | 10 | 80 | 0 | 237 | | | | | | | | | | | | | | |
| 800-815 | 0 | 0 | 0 | 0 | 107 | 11 | 4 | 0 | 2 | 10 | 65 | 0 | 199 | | | | | | | | | | | | | | |
| 815-830 | 0 | 0 | 0 | 0 | 98 | 16 | 2 | 0 | 5 | 2 | 57 | 0 | 180 | | | | | | | | | | | | | | |
| 830-845 | 0 | 0 | 0 | 0 | 76 | 12 | 2 | 0 | 6 | 10 | 77 | 0 | 183 | | | | | | | | | | | | | | |
| 845-900 | 0 | 0 | 0 | 0 | 66 | 10 | 2 | 0 | 5 | -55 | 51 | 0 | 79 | | | | | | | | | | | | | | |
| HOUR TOTALS | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL | | | | | | | | | | | | | | |
| 700-800 | 0 | 0 | 0 | 0 | 312 | 80 | 11 | 0 | 16 | 29 | 252 | 0 | 700 | | | | | | | | | | | | | | |
| 715-815 | 0 | 0 | 0 | 0 | 375 | 74 | 12 | 0 | 12 | 31 | 276 | 0 | 780 | | | | | | | | | | | | | | |
| 730-830 | 0 | 0 | 0 | 0 | 411 | 72 | 12 | 0 | 12 | 31 | 281 | 0 | 819 | | | | | | | | | | | | | | |
| 745-845 | 0 | 0 | 0 | 0 | 399 | 62 | 11 | 0 | 16 | 32 | 279 | 0 | 799 | | | | | | | | | | | | | | |
| 800-900 | 0 | 0 | 0 | 0 | 347 | 49 | 10 | 0 | 18 | -33 | 250 | 0 | 641 | | | | | | | | | | | | | | |



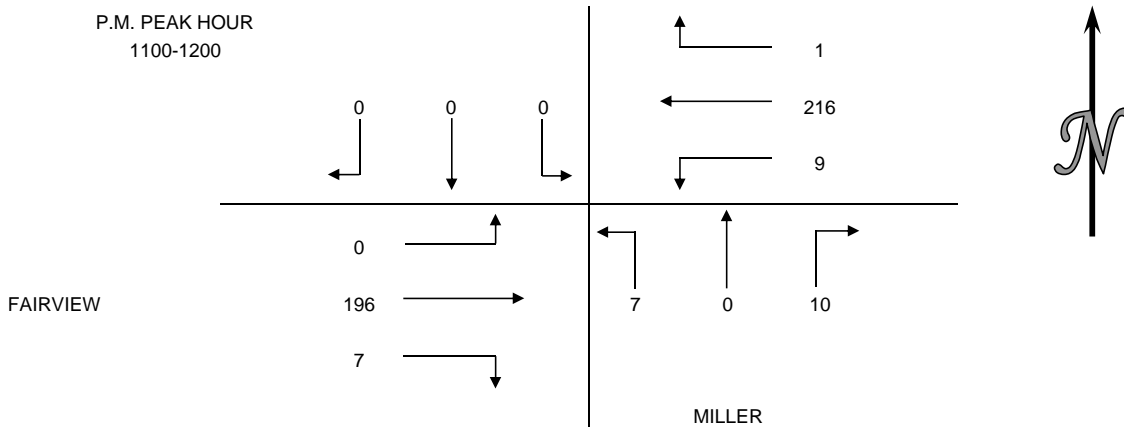
| 15 MIN COUNTS | | | | | | | | | | | | | | 4:00 PM TO 6:00 PM | | | | | | | | | | | | | |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|-------|--------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL | | | | | | | | | | | | | | |
| 400-415 | 0 | 0 | 0 | 0 | 66 | 11 | 16 | 0 | 14 | 8 | 116 | 0 | 231 | | | | | | | | | | | | | | |
| 415-430 | 0 | 0 | 0 | 0 | 60 | 12 | 2 | 0 | 10 | 4 | 97 | 0 | 185 | | | | | | | | | | | | | | |
| 430-445 | 0 | 0 | 0 | 0 | 70 | 5 | 22 | 0 | 30 | 6 | 126 | 2 | 261 | | | | | | | | | | | | | | |
| 445-500 | 0 | 0 | 0 | 0 | 66 | 6 | 9 | 0 | 17 | 2 | 107 | 2 | 209 | | | | | | | | | | | | | | |
| 500-515 | 0 | 0 | 0 | 0 | 71 | 3 | 19 | 0 | 12 | 2 | 91 | 0 | 198 | | | | | | | | | | | | | | |
| 515-530 | 0 | 0 | 0 | 0 | 90 | 4 | 6 | 0 | 9 | 3 | 123 | 0 | 235 | | | | | | | | | | | | | | |
| 530-545 | 0 | 0 | 0 | 0 | 70 | 4 | 8 | 0 | 14 | 2 | 92 | 0 | 190 | | | | | | | | | | | | | | |
| 545-600 | 0 | 0 | 0 | 0 | 53 | 2 | 5 | 0 | 6 | 1 | 72 | 0 | 139 | | | | | | | | | | | | | | |
| HOUR TOTALS | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL | | | | | | | | | | | | | | |
| 400-500 | 0 | 0 | 0 | 0 | 262 | 34 | 49 | 0 | 71 | 20 | 446 | 4 | 886 | | | | | | | | | | | | | | |
| 415-515 | 0 | 0 | 0 | 0 | 267 | 26 | 52 | 0 | 69 | 14 | 421 | 4 | 853 | | | | | | | | | | | | | | |
| 430-530 | 0 | 0 | 0 | 0 | 297 | 18 | 56 | 0 | 68 | 13 | 447 | 4 | 903 | | | | | | | | | | | | | | |
| 445-545 | 0 | 0 | 0 | 0 | 297 | 17 | 42 | 0 | 52 | 9 | 413 | 2 | 832 | | | | | | | | | | | | | | |
| 500-600 | 0 | 0 | 0 | 0 | 284 | 13 | 38 | 0 | 41 | 8 | 378 | 0 | 762 | | | | | | | | | | | | | | |



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: PBS&J
 PROJECT: SAN LEANDRO TRAFFIC COUNTS
 DATE: SATURDAY, JUNE 9, 2007
 PERIOD: 11:00 PM TO 2:00 PM
 INTERSECTION: N/S MILLER
 E/W FAIRVIEW

| 15 MIN COUNTS | | | | | | | | | | | | | |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|-------|
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 1100-1115 | 0 | 0 | 0 | 1 | 68 | 2 | 1 | 0 | 2 | 0 | 53 | 0 | 127 |
| 1115-1130 | 0 | 0 | 0 | 0 | 48 | 2 | 2 | 0 | 2 | 0 | 47 | 0 | 101 |
| 1130-1145 | 0 | 0 | 0 | 0 | 61 | 3 | 5 | 0 | 2 | 3 | 55 | 0 | 129 |
| 1145-1200 | 0 | 0 | 0 | 0 | 39 | 2 | 2 | 0 | 1 | 4 | 41 | 0 | 89 |
| 1200-1215 | 0 | 0 | 0 | 0 | 57 | 1 | 1 | 0 | 4 | 1 | 58 | 0 | 122 |
| 1215-1230 | 0 | 0 | 0 | 0 | 40 | 0 | 1 | 0 | 4 | 0 | 49 | 0 | 94 |
| 1230-1245 | 0 | 0 | 0 | 1 | 45 | 1 | 1 | 0 | 3 | 0 | 52 | 0 | 103 |
| 1245-100 | 0 | 0 | 0 | 0 | 41 | 0 | 2 | 0 | 0 | 1 | 40 | 0 | 84 |
| 100-115 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 3 | 1 | 50 | 0 | 112 |
| 115-130 | 0 | 0 | 0 | 0 | 55 | 3 | 2 | 0 | 2 | 1 | 53 | 0 | 116 |
| 130-145 | 0 | 0 | 0 | 0 | 53 | 0 | 2 | 0 | 1 | 0 | 41 | 0 | 97 |
| 145-200 | 0 | 0 | 0 | 1 | 36 | 0 | 2 | 0 | 3 | 1 | 45 | 0 | 88 |
| HOUR TOTALS | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 1100-1200 | 0 | 0 | 0 | 1 | 216 | 9 | 10 | 0 | 7 | 7 | 196 | 0 | 446 |
| 1115-1215 | 0 | 0 | 0 | 0 | 205 | 8 | 10 | 0 | 9 | 8 | 201 | 0 | 441 |
| 1130-1230 | 0 | 0 | 0 | 0 | 197 | 6 | 9 | 0 | 11 | 8 | 203 | 0 | 434 |
| 1145-1245 | 0 | 0 | 0 | 1 | 181 | 4 | 5 | 0 | 12 | 5 | 200 | 0 | 408 |
| 1200-100 | 0 | 0 | 0 | 1 | 183 | 2 | 5 | 0 | 11 | 2 | 199 | 0 | 403 |
| 1215-115 | 0 | 0 | 0 | 1 | 184 | 1 | 4 | 0 | 10 | 2 | 191 | 0 | 393 |
| 1230-130 | 0 | 0 | 0 | 1 | 199 | 4 | 5 | 0 | 8 | 3 | 195 | 0 | 415 |
| 1245-145 | 0 | 0 | 0 | 0 | 207 | 3 | 6 | 0 | 6 | 3 | 184 | 0 | 409 |
| 100-200 | 0 | 0 | 0 | 1 | 202 | 3 | 6 | 0 | 9 | 3 | 189 | 0 | 413 |



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

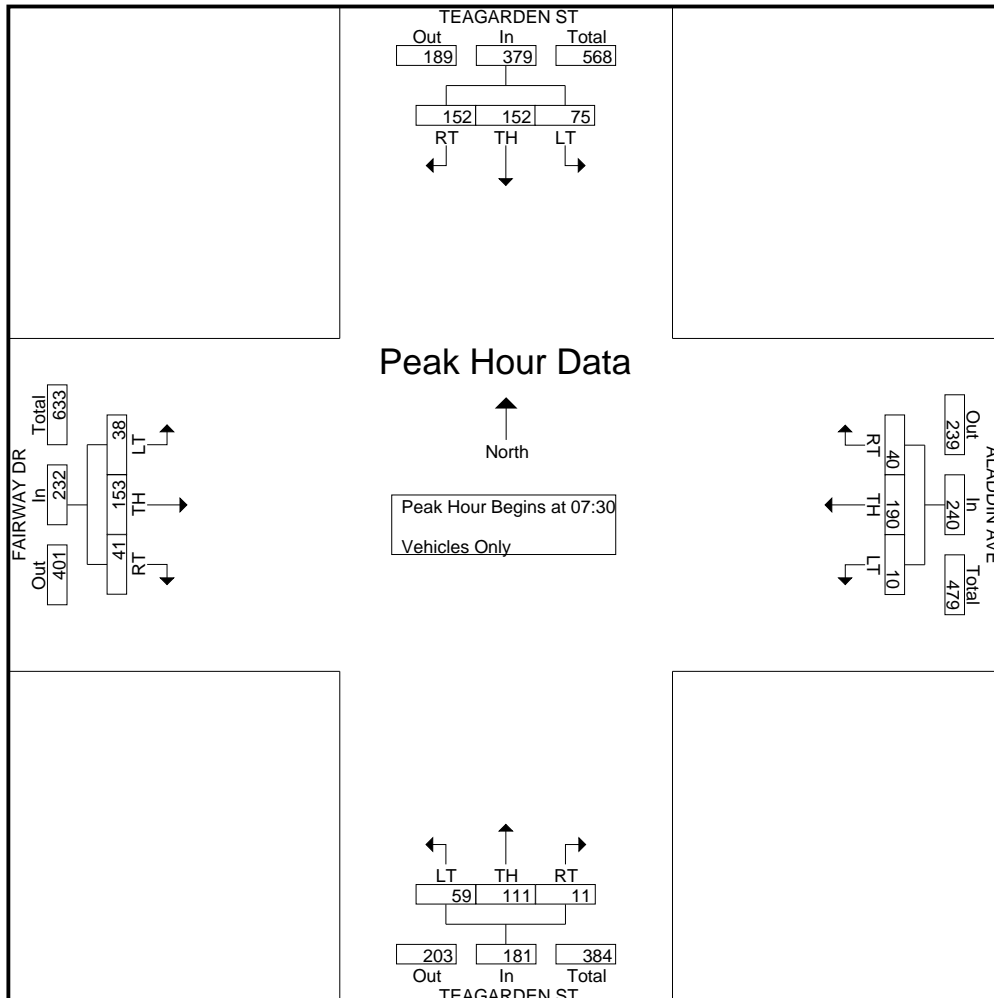
File Name : teagarden-alladin-a
Site Code : 17
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | TEAGARDEN ST Southbound | | | | ALADDIN AVE Westbound | | | | TEAGARDEN ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|----------------------------|------|------|------------|--------------------------|------|-----|------------|----------------------------|------|------|------------|-------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 35 | 47 | 16 | 98 | 5 | 16 | 1 | 22 | 0 | 17 | 9 | 26 | 4 | 17 | 4 | 25 | 171 |
| 07:15 | 42 | 35 | 19 | 96 | 3 | 36 | 2 | 41 | 3 | 20 | 4 | 27 | 11 | 19 | 3 | 33 | 197 |
| 07:30 | 29 | 21 | 17 | 67 | 10 | 36 | 4 | 50 | 1 | 23 | 17 | 41 | 7 | 35 | 5 | 47 | 205 |
| 07:45 | 44 | 44 | 20 | 108 | 8 | 47 | 1 | 56 | 4 | 28 | 18 | 50 | 9 | 48 | 7 | 64 | 278 |
| Total | 150 | 147 | 72 | 369 | 26 | 135 | 8 | 169 | 8 | 88 | 48 | 144 | 31 | 119 | 19 | 169 | 851 |
| 08:00 | 43 | 48 | 18 | 109 | 13 | 53 | 3 | 69 | 5 | 34 | 12 | 51 | 8 | 29 | 10 | 47 | 276 |
| 08:15 | 36 | 39 | 20 | 95 | 9 | 54 | 2 | 65 | 1 | 26 | 12 | 39 | 17 | 41 | 16 | 74 | 273 |
| 08:30 | 41 | 29 | 17 | 87 | 10 | 18 | 2 | 30 | 1 | 30 | 8 | 39 | 16 | 16 | 9 | 41 | 197 |
| 08:45 | 26 | 34 | 17 | 77 | 12 | 20 | 3 | 35 | 1 | 27 | 8 | 36 | 15 | 34 | 14 | 63 | 211 |
| Total | 146 | 150 | 72 | 368 | 44 | 145 | 10 | 199 | 8 | 117 | 40 | 165 | 56 | 120 | 49 | 225 | 957 |
| Grand Total | 296 | 297 | 144 | 737 | 70 | 280 | 18 | 368 | 16 | 205 | 88 | 309 | 87 | 239 | 68 | 394 | 1808 |
| Apprch % | 40.2 | 40.3 | 19.5 | | 19 | 76.1 | 4.9 | | 5.2 | 66.3 | 28.5 | | 22.1 | 60.7 | 17.3 | | |
| Total % | 16.4 | 16.4 | 8 | 40.8 | 3.9 | 15.5 | 1 | 20.4 | 0.9 | 11.3 | 4.9 | 17.1 | 4.8 | 13.2 | 3.8 | 21.8 | |

| Start Time | TEAGARDEN ST Southbound | | | | ALADDIN AVE Westbound | | | | TEAGARDEN ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------|----------------------------|-----------|-----------|------------|--------------------------|-----------|------|------------|----------------------------|-----------|-----------|------------|-------------------------|-----------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 29 | 21 | 17 | 67 | 10 | 36 | 4 | 50 | 1 | 23 | 17 | 41 | 7 | 35 | 5 | 47 | 205 |
| 07:45 | 44 | 44 | 20 | 108 | 8 | 47 | 1 | 56 | 4 | 28 | 18 | 50 | 9 | 48 | 7 | 64 | 278 |
| 08:00 | 43 | 48 | 18 | 109 | 13 | 53 | 3 | 69 | 5 | 34 | 12 | 51 | 8 | 29 | 10 | 47 | 276 |
| 08:15 | 36 | 39 | 20 | 95 | 9 | 54 | 2 | 65 | 1 | 26 | 12 | 39 | 17 | 41 | 16 | 74 | 273 |
| Total Volume | 152 | 152 | 75 | 379 | 40 | 190 | 10 | 240 | 11 | 111 | 59 | 181 | 41 | 153 | 38 | 232 | 1032 |
| % App. Total | 40.1 | 40.1 | 19.8 | | 16.7 | 79.2 | 4.2 | | 6.1 | 61.3 | 32.6 | | 17.7 | 65.9 | 16.4 | | |
| PHF | .864 | .792 | .938 | .869 | .769 | .880 | .625 | .870 | .550 | .816 | .819 | .887 | .603 | .797 | .594 | .784 | .928 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

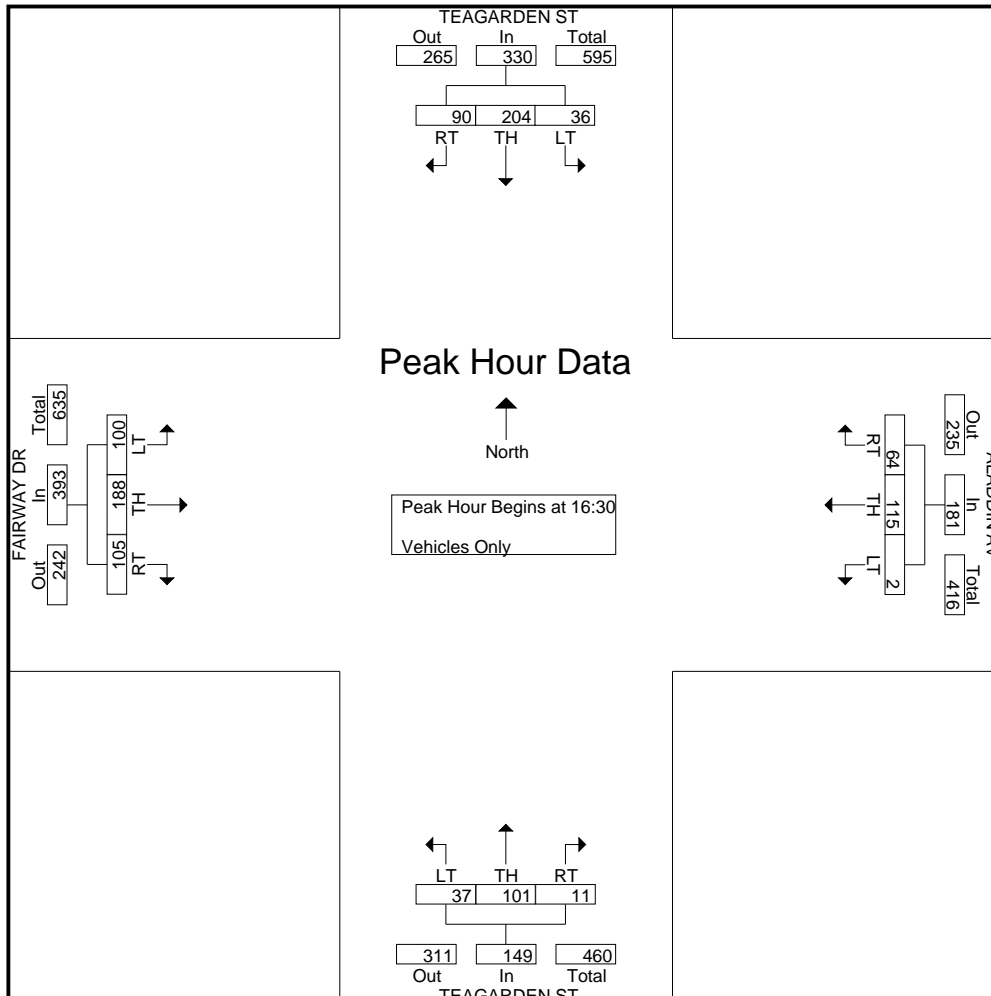
File Name : teagarden-aladdin-p
Site Code : 17
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | TEAGARDEN ST Southbound | | | | ALADDIN AV Westbound | | | | TEAGARDEN ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|----------------------------|------------|-----------|------------|-------------------------|------------|----------|------------|----------------------------|------------|-----------|------------|-------------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 24 | 42 | 8 | 74 | 14 | 21 | 2 | 37 | 4 | 28 | 8 | 40 | 23 | 39 | 16 | 78 | 229 |
| 16:15 | 15 | 40 | 15 | 70 | 18 | 23 | 3 | 44 | 4 | 16 | 9 | 29 | 25 | 34 | 12 | 71 | 214 |
| 16:30 | 19 | 52 | 12 | 83 | 21 | 34 | 2 | 57 | 2 | 35 | 12 | 49 | 23 | 37 | 35 | 95 | 284 |
| 16:45 | 18 | 55 | 10 | 83 | 20 | 26 | 0 | 46 | 3 | 21 | 6 | 30 | 17 | 42 | 22 | 81 | 240 |
| Total | 76 | 189 | 45 | 310 | 73 | 104 | 7 | 184 | 13 | 100 | 35 | 148 | 88 | 152 | 85 | 325 | 967 |
| 17:00 | 34 | 48 | 6 | 88 | 13 | 35 | 0 | 48 | 2 | 25 | 12 | 39 | 29 | 64 | 23 | 116 | 291 |
| 17:15 | 19 | 49 | 8 | 76 | 10 | 20 | 0 | 30 | 4 | 20 | 7 | 31 | 36 | 45 | 20 | 101 | 238 |
| 17:30 | 15 | 40 | 11 | 66 | 12 | 34 | 0 | 46 | 0 | 27 | 10 | 37 | 24 | 47 | 11 | 82 | 231 |
| 17:45 | 24 | 41 | 6 | 71 | 10 | 23 | 0 | 33 | 0 | 14 | 5 | 19 | 27 | 29 | 9 | 65 | 188 |
| Total | 92 | 178 | 31 | 301 | 45 | 112 | 0 | 157 | 6 | 86 | 34 | 126 | 116 | 185 | 63 | 364 | 948 |
| Grand Total | 168 | 367 | 76 | 611 | 118 | 216 | 7 | 341 | 19 | 186 | 69 | 274 | 204 | 337 | 148 | 689 | 1915 |
| Apprch % | 27.5 | 60.1 | 12.4 | | 34.6 | 63.3 | 2.1 | | 6.9 | 67.9 | 25.2 | | 29.6 | 48.9 | 21.5 | | |
| Total % | 8.8 | 19.2 | 4 | 31.9 | 6.2 | 11.3 | 0.4 | 17.8 | 1 | 9.7 | 3.6 | 14.3 | 10.7 | 17.6 | 7.7 | 36 | |

| Start Time | TEAGARDEN ST Southbound | | | | ALADDIN AV Westbound | | | | TEAGARDEN ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|---------------------|----------------------------|------------|-----------|------------|-------------------------|------------|----------|------------|----------------------------|------------|-----------|------------|-------------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:30 | 19 | 52 | 12 | 83 | 21 | 34 | 2 | 57 | 2 | 35 | 12 | 49 | 23 | 37 | 35 | 95 | 284 |
| 16:45 | 18 | 55 | 10 | 83 | 20 | 26 | 0 | 46 | 3 | 21 | 6 | 30 | 17 | 42 | 22 | 81 | 240 |
| 17:00 | 34 | 48 | 6 | 88 | 13 | 35 | 0 | 48 | 2 | 25 | 12 | 39 | 29 | 64 | 23 | 116 | 291 |
| 17:15 | 19 | 49 | 8 | 76 | 10 | 20 | 0 | 30 | 4 | 20 | 7 | 31 | 36 | 45 | 20 | 101 | 238 |
| Total Volume | 90 | 204 | 36 | 330 | 64 | 115 | 2 | 181 | 11 | 101 | 37 | 149 | 105 | 188 | 100 | 393 | 1053 |
| % App. Total | 27.3 | 61.8 | 10.9 | | 35.4 | 63.5 | 1.1 | | 7.4 | 67.8 | 24.8 | | 26.7 | 47.8 | 25.4 | | |
| PHF | .662 | .927 | .750 | .938 | .762 | .821 | .250 | .794 | .688 | .721 | .771 | .760 | .729 | .734 | .714 | .847 | .905 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : teagarden-aladdin-s
Site Code : 17
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | TEAGARDEN ST Southbound | | | | ALADDIN AVE Westbound | | | | TEAGARDEN ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|--------------------|----------------------------|------------|-----------|------------|--------------------------|------------|-----------|------------|----------------------------|------------|------------|------------|-------------------------|------------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 14 | 16 | 5 | 35 | 2 | 25 | 0 | 27 | 0 | 13 | 2 | 15 | 14 | 21 | 13 | 48 | 125 |
| 10:15 | 11 | 19 | 4 | 34 | 5 | 12 | 1 | 18 | 1 | 14 | 3 | 18 | 12 | 25 | 8 | 45 | 115 |
| 10:30 | 15 | 19 | 3 | 37 | 9 | 20 | 0 | 29 | 1 | 4 | 3 | 8 | 14 | 23 | 9 | 46 | 120 |
| 10:45 | 17 | 24 | 4 | 45 | 5 | 28 | 0 | 33 | 1 | 10 | 14 | 25 | 14 | 19 | 7 | 40 | 143 |
| Total | 57 | 78 | 16 | 151 | 21 | 85 | 1 | 107 | 3 | 41 | 22 | 66 | 54 | 88 | 37 | 179 | 503 |
| 11:00 | 13 | 20 | 6 | 39 | 4 | 25 | 0 | 29 | 1 | 13 | 12 | 26 | 18 | 22 | 5 | 45 | 139 |
| 11:15 | 12 | 27 | 12 | 51 | 9 | 11 | 1 | 21 | 0 | 13 | 4 | 17 | 19 | 13 | 13 | 45 | 134 |
| 11:30 | 19 | 31 | 10 | 60 | 8 | 20 | 3 | 31 | 2 | 18 | 4 | 24 | 16 | 22 | 5 | 43 | 158 |
| 11:45 | 23 | 35 | 5 | 63 | 5 | 23 | 0 | 28 | 0 | 18 | 13 | 31 | 22 | 26 | 9 | 57 | 179 |
| Total | 67 | 113 | 33 | 213 | 26 | 79 | 4 | 109 | 3 | 62 | 33 | 98 | 75 | 83 | 32 | 190 | 610 |
| 12:00 | 14 | 31 | 7 | 52 | 8 | 27 | 1 | 36 | 2 | 14 | 12 | 28 | 15 | 21 | 11 | 47 | 163 |
| 12:15 | 15 | 31 | 2 | 48 | 6 | 20 | 1 | 27 | 1 | 11 | 13 | 25 | 16 | 32 | 9 | 57 | 157 |
| 12:30 | 19 | 29 | 7 | 55 | 6 | 22 | 0 | 28 | 1 | 11 | 10 | 22 | 11 | 21 | 20 | 52 | 157 |
| 12:45 | 22 | 35 | 3 | 60 | 10 | 24 | 1 | 35 | 0 | 10 | 11 | 21 | 13 | 23 | 15 | 51 | 167 |
| Total | 70 | 126 | 19 | 215 | 30 | 93 | 3 | 126 | 4 | 46 | 46 | 96 | 55 | 97 | 55 | 207 | 644 |
| 13:00 | 19 | 26 | 9 | 54 | 9 | 33 | 2 | 44 | 1 | 17 | 4 | 22 | 16 | 15 | 12 | 43 | 163 |
| 13:15 | 15 | 25 | 4 | 44 | 6 | 19 | 2 | 27 | 1 | 18 | 9 | 28 | 19 | 29 | 11 | 59 | 158 |
| 13:30 | 15 | 32 | 5 | 52 | 2 | 24 | 0 | 26 | 1 | 18 | 10 | 29 | 18 | 20 | 7 | 45 | 152 |
| 13:45 | 17 | 24 | 7 | 48 | 4 | 21 | 3 | 28 | 3 | 17 | 10 | 30 | 17 | 27 | 6 | 50 | 156 |
| Total | 66 | 107 | 25 | 198 | 21 | 97 | 7 | 125 | 6 | 70 | 33 | 109 | 70 | 91 | 36 | 197 | 629 |
| Grand Total | 260 | 424 | 93 | 777 | 98 | 354 | 15 | 467 | 16 | 219 | 134 | 369 | 254 | 359 | 160 | 773 | 2386 |
| Apprch % | 33.5 | 54.6 | 12 | | 21 | 75.8 | 3.2 | | 4.3 | 59.3 | 36.3 | | 32.9 | 46.4 | 20.7 | | |
| Total % | 10.9 | 17.8 | 3.9 | 32.6 | 4.1 | 14.8 | 0.6 | 19.6 | 0.7 | 9.2 | 5.6 | 15.5 | 10.6 | 15 | 6.7 | 32.4 | |

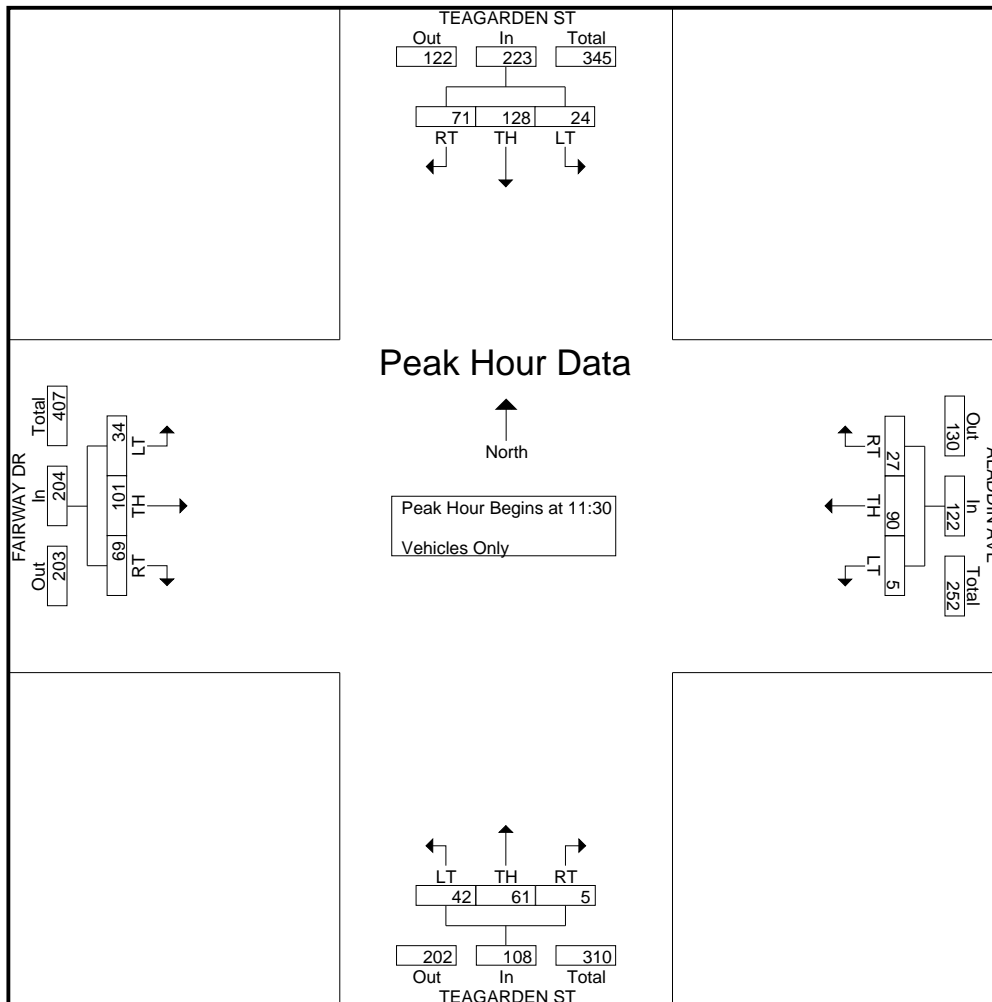
| Start Time | TEAGARDEN ST Southbound | | | | ALADDIN AVE Westbound | | | | TEAGARDEN ST Northbound | | | | FAIRWAY DR Eastbound | | | | Int. Total |
|---|----------------------------|-------------|-------------|-------------|--------------------------|-------------|-------------|-------------|----------------------------|-------------|-------------|-------------|-------------------------|-------------|-------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 11:30 | | | | | | | | | | | | | | | | | |
| 11:30 | 19 | 31 | 10 | 60 | 8 | 20 | 3 | 31 | 2 | 18 | 4 | 24 | 16 | 22 | 5 | 43 | 158 |
| 11:45 | 23 | 35 | 5 | 63 | 5 | 23 | 0 | 28 | 0 | 18 | 13 | 31 | 22 | 26 | 9 | 57 | 179 |
| 12:00 | 14 | 31 | 7 | 52 | 8 | 27 | 1 | 36 | 2 | 14 | 12 | 28 | 15 | 21 | 11 | 47 | 163 |
| 12:15 | 15 | 31 | 2 | 48 | 6 | 20 | 1 | 27 | 1 | 11 | 13 | 25 | 16 | 32 | 9 | 57 | 157 |
| Total Volume | 71 | 128 | 24 | 223 | 27 | 90 | 5 | 122 | 5 | 61 | 42 | 108 | 69 | 101 | 34 | 204 | 657 |
| % App. Total | 31.8 | 57.4 | 10.8 | | 22.1 | 73.8 | 4.1 | | 4.6 | 56.5 | 38.9 | | 33.8 | 49.5 | 16.7 | | |
| PHF | .772 | .914 | .600 | .885 | .844 | .833 | .417 | .847 | .625 | .847 | .808 | .871 | .784 | .789 | .773 | .895 | .918 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : teagarden-aladdin-s
Site Code : 17
Start Date : 2/2/2013
Page No : 2



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

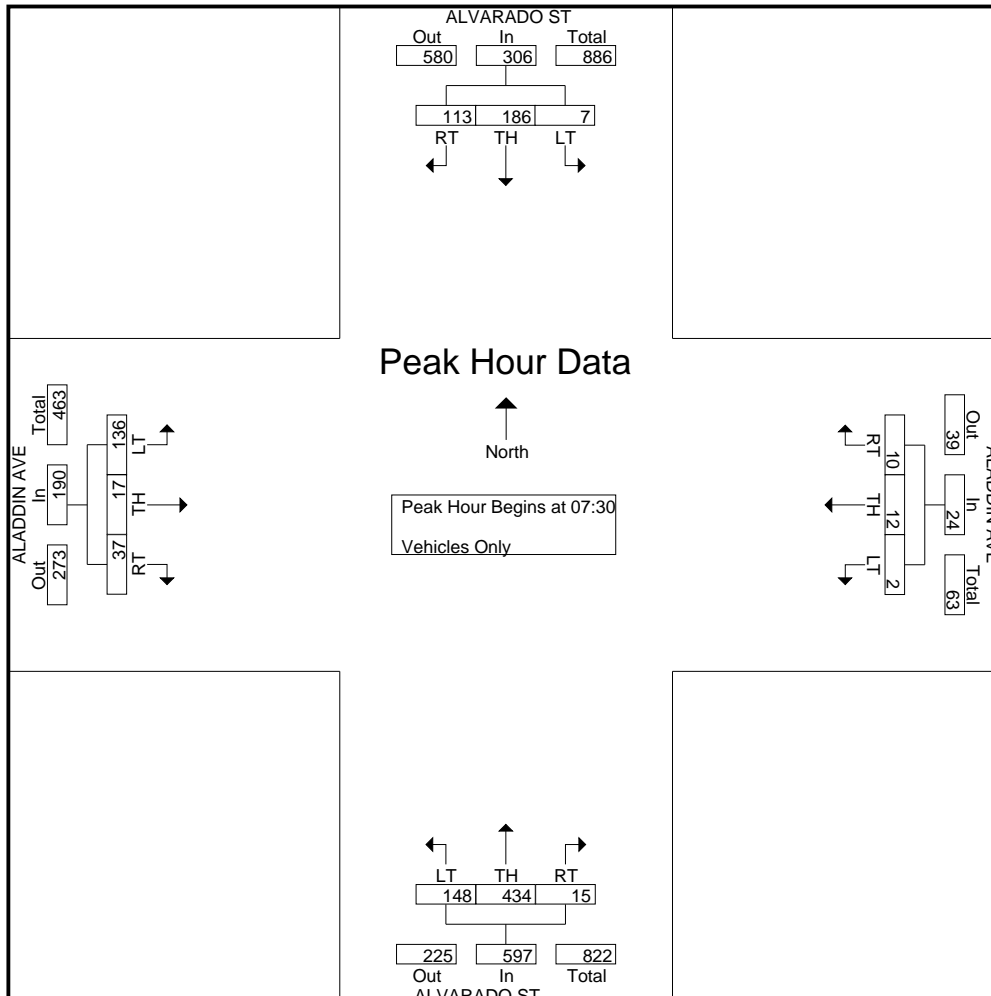
File Name : alvarado-aladdin-a
Site Code : 18
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | ALVARADO ST Southbound | | | | ALADDIN AVE Westbound | | | | ALVARADO ST Northbound | | | | ALADDIN AVE Eastbound | | | | Int. Total |
|--------------------|---------------------------|------------|-----------|------------|--------------------------|-----------|----------|------------|---------------------------|------------|------------|------------|--------------------------|-----------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 14 | 32 | 0 | 46 | 0 | 0 | 0 | 0 | 2 | 63 | 19 | 84 | 7 | 1 | 17 | 25 | 155 |
| 07:15 | 22 | 31 | 3 | 56 | 0 | 2 | 1 | 3 | 2 | 77 | 23 | 102 | 10 | 2 | 12 | 24 | 185 |
| 07:30 | 26 | 25 | 2 | 53 | 1 | 4 | 0 | 5 | 2 | 84 | 29 | 115 | 7 | 5 | 28 | 40 | 213 |
| 07:45 | 23 | 53 | 3 | 79 | 2 | 4 | 1 | 7 | 4 | 133 | 36 | 173 | 12 | 7 | 45 | 64 | 323 |
| Total | 85 | 141 | 8 | 234 | 3 | 10 | 2 | 15 | 10 | 357 | 107 | 474 | 36 | 15 | 102 | 153 | 876 |
| 08:00 | 38 | 61 | 1 | 100 | 2 | 3 | 1 | 6 | 3 | 106 | 39 | 148 | 9 | 4 | 32 | 45 | 299 |
| 08:15 | 26 | 47 | 1 | 74 | 5 | 1 | 0 | 6 | 6 | 111 | 44 | 161 | 9 | 1 | 31 | 41 | 282 |
| 08:30 | 9 | 43 | 7 | 59 | 4 | 5 | 1 | 10 | 2 | 75 | 18 | 95 | 6 | 0 | 15 | 21 | 185 |
| 08:45 | 13 | 44 | 5 | 62 | 5 | 0 | 0 | 5 | 5 | 65 | 20 | 90 | 10 | 5 | 30 | 45 | 202 |
| Total | 86 | 195 | 14 | 295 | 16 | 9 | 2 | 27 | 16 | 357 | 121 | 494 | 34 | 10 | 108 | 152 | 968 |
| Grand Total | 171 | 336 | 22 | 529 | 19 | 19 | 4 | 42 | 26 | 714 | 228 | 968 | 70 | 25 | 210 | 305 | 1844 |
| Apprch % | 32.3 | 63.5 | 4.2 | | 45.2 | 45.2 | 9.5 | | 2.7 | 73.8 | 23.6 | | 23 | 8.2 | 68.9 | | |
| Total % | 9.3 | 18.2 | 1.2 | 28.7 | 1 | 1 | 0.2 | 2.3 | 1.4 | 38.7 | 12.4 | 52.5 | 3.8 | 1.4 | 11.4 | 16.5 | |

| Start Time | ALVARADO ST Southbound | | | | ALADDIN AVE Westbound | | | | ALVARADO ST Northbound | | | | ALADDIN AVE Eastbound | | | | Int. Total |
|---------------------|---------------------------|------------|----------|------------|--------------------------|-----------|----------|------------|---------------------------|------------|------------|------------|--------------------------|-----------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 26 | 25 | 2 | 53 | 1 | 4 | 0 | 5 | 2 | 84 | 29 | 115 | 7 | 5 | 28 | 40 | 213 |
| 07:45 | 23 | 53 | 3 | 79 | 2 | 4 | 1 | 7 | 4 | 133 | 36 | 173 | 12 | 7 | 45 | 64 | 323 |
| 08:00 | 38 | 61 | 1 | 100 | 2 | 3 | 1 | 6 | 3 | 106 | 39 | 148 | 9 | 4 | 32 | 45 | 299 |
| 08:15 | 26 | 47 | 1 | 74 | 5 | 1 | 0 | 6 | 6 | 111 | 44 | 161 | 9 | 1 | 31 | 41 | 282 |
| Total Volume | 113 | 186 | 7 | 306 | 10 | 12 | 2 | 24 | 15 | 434 | 148 | 597 | 37 | 17 | 136 | 190 | 1117 |
| % App. Total | 36.9 | 60.8 | 2.3 | | 41.7 | 50 | 8.3 | | 2.5 | 72.7 | 24.8 | | 19.5 | 8.9 | 71.6 | | |
| PHF | .743 | .762 | .583 | .765 | .500 | .750 | .500 | .857 | .625 | .816 | .841 | .863 | .771 | .607 | .756 | .742 | .865 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



Peak Hour Begins at 07:30
Vehicles Only

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

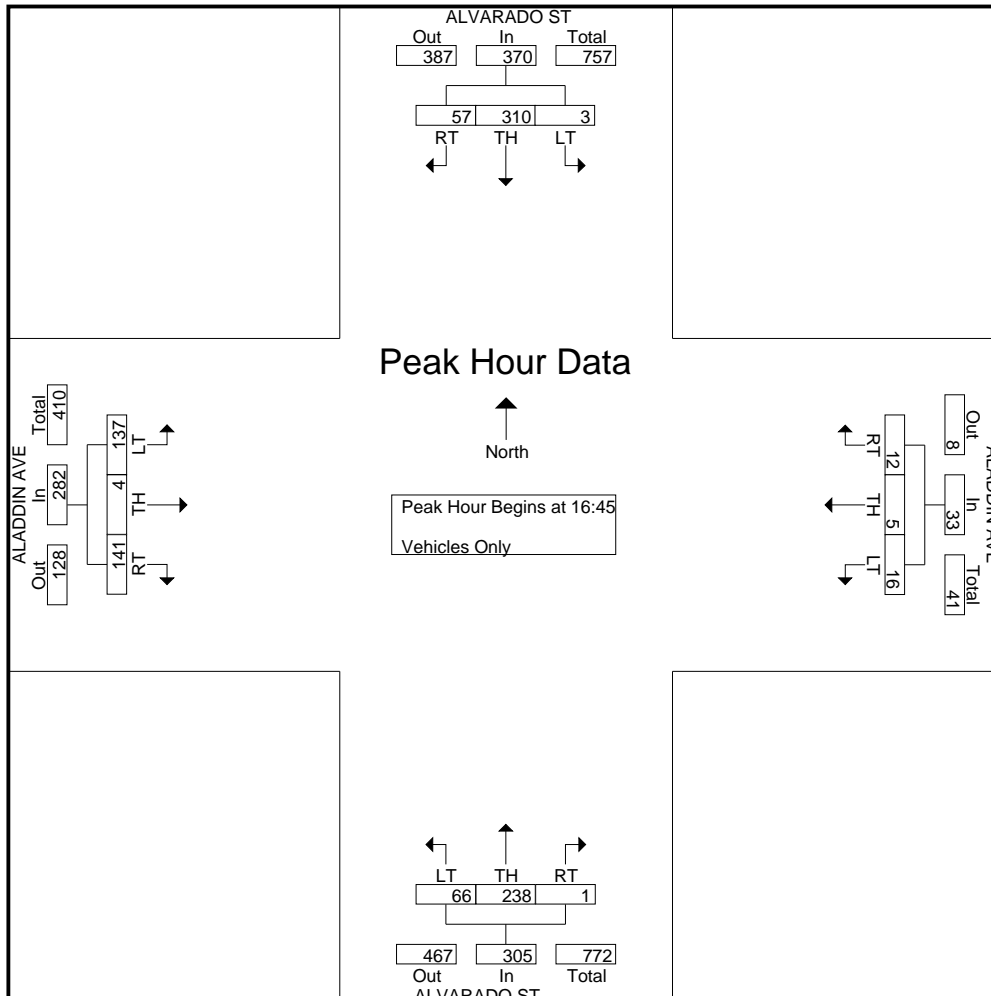
File Name : alvarado-aladdin-p
Site Code : 18
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | ALVARADO ST Southbound | | | | ALADDIN AVE Westbound | | | | ALVARADO ST Northbound | | | | ALADDIN AVE Eastbound | | | | Int. Total |
|--------------------|---------------------------|------------|-----------|------------|--------------------------|----------|-----------|------------|---------------------------|------------|------------|------------|--------------------------|-----------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 11 | 66 | 0 | 77 | 5 | 1 | 3 | 9 | 2 | 69 | 12 | 83 | 36 | 5 | 24 | 65 | 234 |
| 16:15 | 13 | 57 | 2 | 72 | 3 | 0 | 2 | 5 | 0 | 66 | 19 | 85 | 23 | 1 | 27 | 51 | 213 |
| 16:30 | 15 | 78 | 3 | 96 | 3 | 0 | 3 | 6 | 1 | 47 | 21 | 69 | 34 | 0 | 29 | 63 | 234 |
| 16:45 | 15 | 84 | 2 | 101 | 5 | 1 | 7 | 13 | 1 | 52 | 15 | 68 | 32 | 1 | 29 | 62 | 244 |
| Total | 54 | 285 | 7 | 346 | 16 | 2 | 15 | 33 | 4 | 234 | 67 | 305 | 125 | 7 | 109 | 241 | 925 |
| 17:00 | 17 | 85 | 0 | 102 | 2 | 3 | 8 | 13 | 0 | 63 | 19 | 82 | 42 | 2 | 43 | 87 | 284 |
| 17:15 | 12 | 69 | 1 | 82 | 3 | 0 | 0 | 3 | 0 | 60 | 13 | 73 | 33 | 0 | 31 | 64 | 222 |
| 17:30 | 13 | 72 | 0 | 85 | 2 | 1 | 1 | 4 | 0 | 63 | 19 | 82 | 34 | 1 | 34 | 69 | 240 |
| 17:45 | 8 | 67 | 3 | 78 | 4 | 2 | 0 | 6 | 2 | 73 | 21 | 96 | 16 | 0 | 18 | 34 | 214 |
| Total | 50 | 293 | 4 | 347 | 11 | 6 | 9 | 26 | 2 | 259 | 72 | 333 | 125 | 3 | 126 | 254 | 960 |
| Grand Total | 104 | 578 | 11 | 693 | 27 | 8 | 24 | 59 | 6 | 493 | 139 | 638 | 250 | 10 | 235 | 495 | 1885 |
| Apprch % | 15 | 83.4 | 1.6 | | 45.8 | 13.6 | 40.7 | | 0.9 | 77.3 | 21.8 | | 50.5 | 2 | 47.5 | | |
| Total % | 5.5 | 30.7 | 0.6 | 36.8 | 1.4 | 0.4 | 1.3 | 3.1 | 0.3 | 26.2 | 7.4 | 33.8 | 13.3 | 0.5 | 12.5 | 26.3 | |

| Start Time | ALVARADO ST Southbound | | | | ALADDIN AVE Westbound | | | | ALVARADO ST Northbound | | | | ALADDIN AVE Eastbound | | | | Int. Total |
|---------------------|---------------------------|------------|----------|------------|--------------------------|----------|-----------|------------|---------------------------|------------|-----------|------------|--------------------------|----------|------------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:45 | 15 | 84 | 2 | 101 | 5 | 1 | 7 | 13 | 1 | 52 | 15 | 68 | 32 | 1 | 29 | 62 | 244 |
| 17:00 | 17 | 85 | 0 | 102 | 2 | 3 | 8 | 13 | 0 | 63 | 19 | 82 | 42 | 2 | 43 | 87 | 284 |
| 17:15 | 12 | 69 | 1 | 82 | 3 | 0 | 0 | 3 | 0 | 60 | 13 | 73 | 33 | 0 | 31 | 64 | 222 |
| 17:30 | 13 | 72 | 0 | 85 | 2 | 1 | 1 | 4 | 0 | 63 | 19 | 82 | 34 | 1 | 34 | 69 | 240 |
| Total Volume | 57 | 310 | 3 | 370 | 12 | 5 | 16 | 33 | 1 | 238 | 66 | 305 | 141 | 4 | 137 | 282 | 990 |
| % App. Total | 15.4 | 83.8 | 0.8 | | 36.4 | 15.2 | 48.5 | | 0.3 | 78 | 21.6 | | 50 | 1.4 | 48.6 | | |
| PHF | .838 | .912 | .375 | .907 | .600 | .417 | .500 | .635 | .250 | .944 | .868 | .930 | .839 | .500 | .797 | .810 | .871 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:45



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : alvarado-aladdin-s
Site Code : 18
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | ALVARADO ST Southbound | | | | ALADDIN AVE Westbound | | | | ALVARADO ST Northbound | | | | ALADDIN AVE Eastbound | | | | Int. Total |
|-------------|---------------------------|------|-----|------------|--------------------------|------|------|------------|---------------------------|------|------|------------|--------------------------|-----|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 6 | 31 | 0 | 37 | 0 | 1 | 0 | 1 | 0 | 35 | 17 | 52 | 9 | 1 | 14 | 24 | 114 |
| 10:15 | 3 | 22 | 1 | 26 | 0 | 0 | 0 | 0 | 0 | 44 | 8 | 52 | 13 | 0 | 11 | 24 | 102 |
| 10:30 | 9 | 24 | 3 | 36 | 1 | 0 | 1 | 2 | 0 | 51 | 22 | 73 | 10 | 1 | 16 | 27 | 138 |
| 10:45 | 13 | 35 | 0 | 48 | 0 | 0 | 2 | 2 | 0 | 61 | 22 | 83 | 11 | 1 | 15 | 27 | 160 |
| Total | 31 | 112 | 4 | 147 | 1 | 1 | 3 | 5 | 0 | 191 | 69 | 260 | 43 | 3 | 56 | 102 | 514 |
| 11:00 | 12 | 32 | 2 | 46 | 2 | 0 | 0 | 2 | 0 | 66 | 15 | 81 | 12 | 0 | 15 | 27 | 156 |
| 11:15 | 6 | 30 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 53 | 11 | 64 | 12 | 0 | 9 | 21 | 121 |
| 11:30 | 7 | 44 | 0 | 51 | 0 | 0 | 1 | 1 | 0 | 71 | 21 | 92 | 14 | 0 | 13 | 27 | 171 |
| 11:45 | 10 | 46 | 1 | 57 | 1 | 1 | 0 | 2 | 1 | 71 | 22 | 94 | 20 | 2 | 12 | 34 | 187 |
| Total | 35 | 152 | 3 | 190 | 3 | 1 | 1 | 5 | 1 | 261 | 69 | 331 | 58 | 2 | 49 | 109 | 635 |
| 12:00 | 8 | 38 | 3 | 49 | 2 | 0 | 1 | 3 | 1 | 58 | 21 | 80 | 15 | 0 | 15 | 30 | 162 |
| 12:15 | 10 | 40 | 1 | 51 | 2 | 2 | 0 | 4 | 1 | 67 | 12 | 80 | 13 | 0 | 18 | 31 | 166 |
| 12:30 | 6 | 44 | 1 | 51 | 0 | 0 | 2 | 2 | 0 | 56 | 20 | 76 | 14 | 1 | 12 | 27 | 156 |
| 12:45 | 2 | 44 | 2 | 48 | 2 | 0 | 0 | 2 | 2 | 53 | 26 | 81 | 13 | 0 | 12 | 25 | 156 |
| Total | 26 | 166 | 7 | 199 | 6 | 2 | 3 | 11 | 4 | 234 | 79 | 317 | 55 | 1 | 57 | 113 | 640 |
| 13:00 | 11 | 33 | 1 | 45 | 1 | 1 | 3 | 5 | 1 | 82 | 25 | 108 | 15 | 0 | 11 | 26 | 184 |
| 13:15 | 3 | 34 | 0 | 37 | 3 | 1 | 1 | 5 | 1 | 52 | 19 | 72 | 15 | 2 | 18 | 35 | 149 |
| 13:30 | 10 | 38 | 1 | 49 | 3 | 1 | 1 | 5 | 1 | 57 | 16 | 74 | 13 | 0 | 11 | 24 | 152 |
| 13:45 | 10 | 41 | 2 | 53 | 2 | 0 | 1 | 3 | 0 | 52 | 15 | 67 | 16 | 2 | 17 | 35 | 158 |
| Total | 34 | 146 | 4 | 184 | 9 | 3 | 6 | 18 | 3 | 243 | 75 | 321 | 59 | 4 | 57 | 120 | 643 |
| Grand Total | 126 | 576 | 18 | 720 | 19 | 7 | 13 | 39 | 8 | 929 | 292 | 1229 | 215 | 10 | 219 | 444 | 2432 |
| Apprch % | 17.5 | 80 | 2.5 | | 48.7 | 17.9 | 33.3 | | 0.7 | 75.6 | 23.8 | | 48.4 | 2.3 | 49.3 | | |
| Total % | 5.2 | 23.7 | 0.7 | 29.6 | 0.8 | 0.3 | 0.5 | 1.6 | 0.3 | 38.2 | 12 | 50.5 | 8.8 | 0.4 | 9 | 18.3 | |

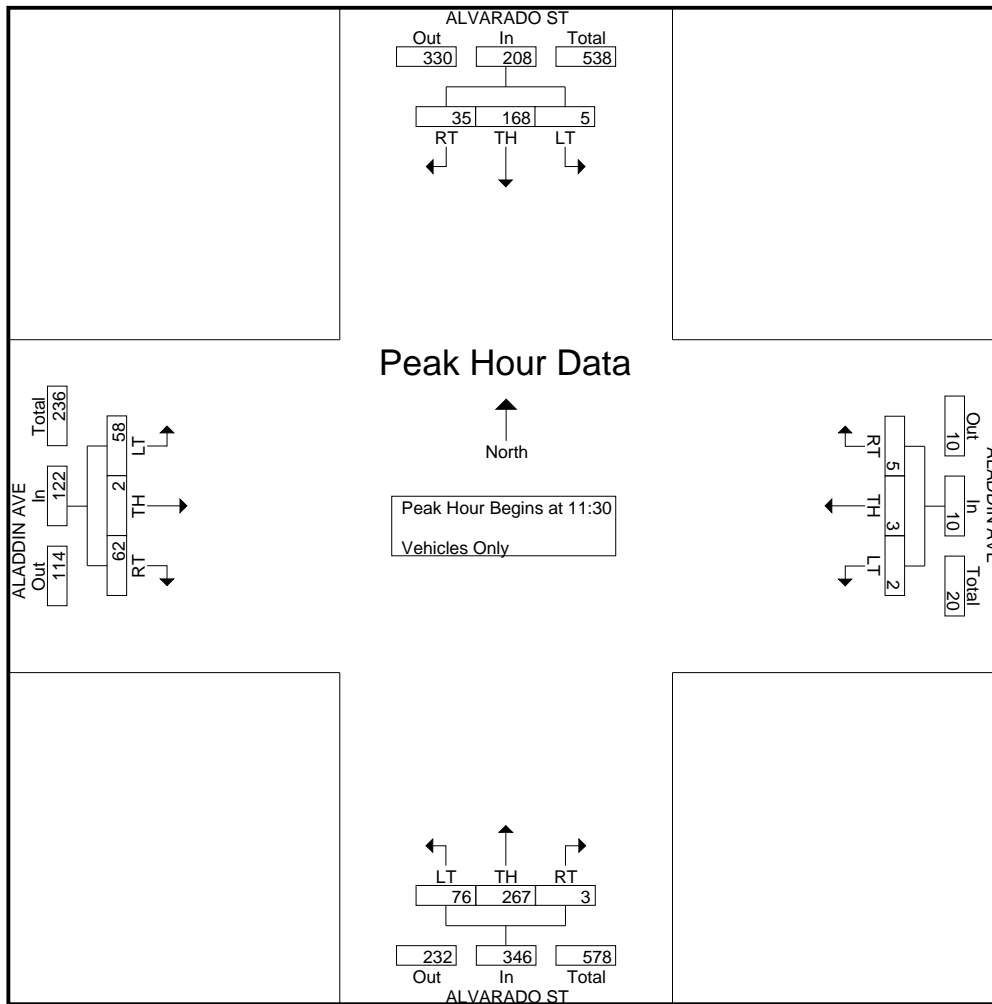
| Start Time | ALVARADO ST Southbound | | | | ALADDIN AVE Westbound | | | | ALVARADO ST Northbound | | | | ALADDIN AVE Eastbound | | | | Int. Total |
|--|---------------------------|------|------|------------|--------------------------|------|------|------------|---------------------------|------|------|------------|--------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 11:30 | | | | | | | | | | | | | | | | | |
| 11:30 | 7 | 44 | 0 | 51 | 0 | 0 | 1 | 1 | 0 | 71 | 21 | 92 | 14 | 0 | 13 | 27 | 171 |
| 11:45 | 10 | 46 | 1 | 57 | 1 | 1 | 0 | 2 | 1 | 71 | 22 | 94 | 20 | 2 | 12 | 34 | 187 |
| 12:00 | 8 | 38 | 3 | 49 | 2 | 0 | 1 | 3 | 1 | 58 | 21 | 80 | 15 | 0 | 15 | 30 | 162 |
| 12:15 | 10 | 40 | 1 | 51 | 2 | 2 | 0 | 4 | 1 | 67 | 12 | 80 | 13 | 0 | 18 | 31 | 166 |
| Total Volume | 35 | 168 | 5 | 208 | 5 | 3 | 2 | 10 | 3 | 267 | 76 | 346 | 62 | 2 | 58 | 122 | 686 |
| % App. Total | 16.8 | 80.8 | 2.4 | | 50 | 30 | 20 | | 0.9 | 77.2 | 22 | | 50.8 | 1.6 | 47.5 | | |
| PHF | .875 | .913 | .417 | .912 | .625 | .375 | .500 | .625 | .750 | .940 | .864 | .920 | .775 | .250 | .806 | .897 | .917 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : alvarado-aladdin-s
Site Code : 18
Start Date : 2/2/2013
Page No : 2



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-well fargo-a
Site Code : 23
Start Date : 1/23/2013
Page No : 1

Groups Printed- Vehicles Only

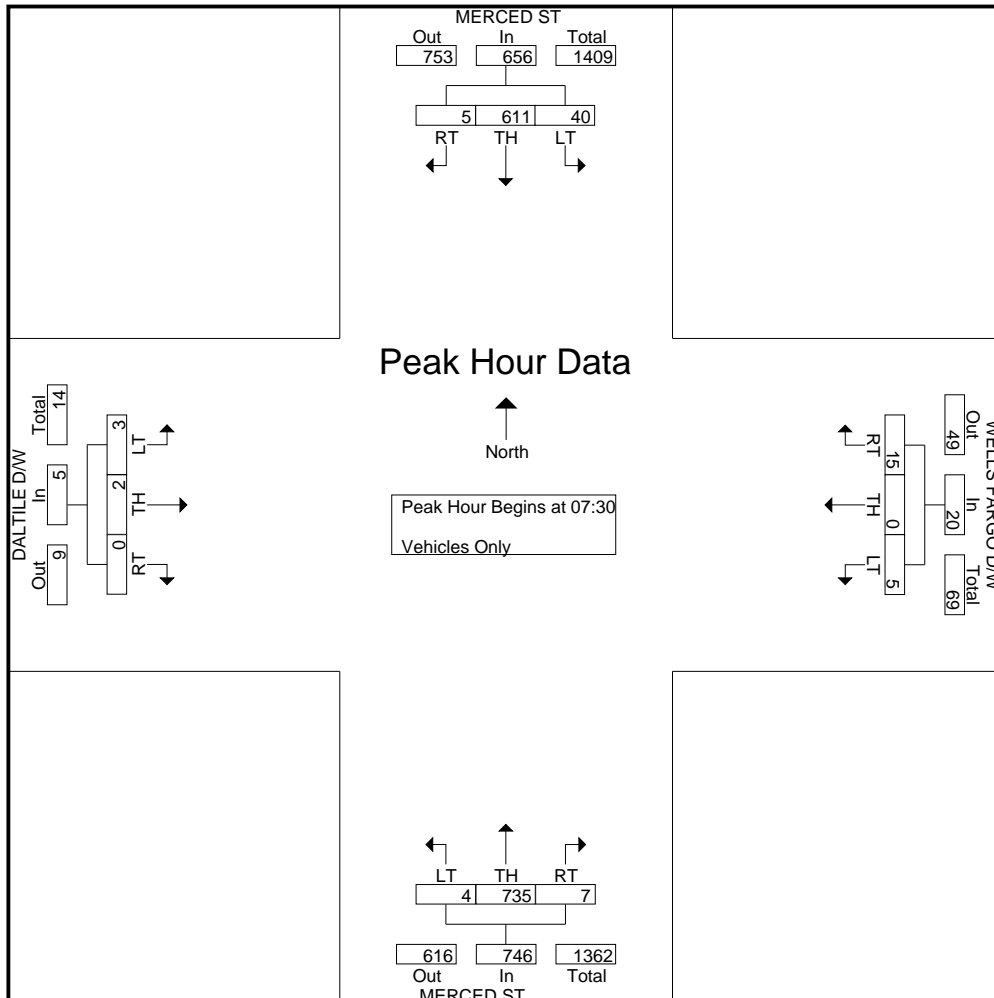
| Start Time | MERCED ST Southbound | | | | WELLS FARGO D/W Westbound | | | | MERCED ST Northbound | | | | DAL TILE D/W Eastbound | | | | Int. Total |
|--------------------|-------------------------|-------------|-----------|-------------|------------------------------|----------|-----------|------------|-------------------------|-------------|----------|-------------|---------------------------|----------|----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 0 | 129 | 8 | 137 | 5 | 0 | 1 | 6 | 6 | 126 | 1 | 133 | 0 | 0 | 0 | 0 | 276 |
| 07:15 | 1 | 124 | 7 | 132 | 2 | 0 | 3 | 5 | 2 | 168 | 0 | 170 | 0 | 0 | 0 | 0 | 307 |
| 07:30 | 2 | 152 | 11 | 165 | 4 | 0 | 1 | 5 | 1 | 187 | 0 | 188 | 0 | 0 | 1 | 1 | 359 |
| 07:45 | 2 | 172 | 3 | 177 | 5 | 0 | 2 | 7 | 1 | 182 | 1 | 184 | 0 | 2 | 0 | 2 | 370 |
| Total | 5 | 577 | 29 | 611 | 16 | 0 | 7 | 23 | 10 | 663 | 2 | 675 | 0 | 2 | 1 | 3 | 1312 |
| 08:00 | 0 | 156 | 11 | 167 | 3 | 0 | 1 | 4 | 3 | 199 | 1 | 203 | 0 | 0 | 0 | 0 | 374 |
| 08:15 | 1 | 131 | 15 | 147 | 3 | 0 | 1 | 4 | 2 | 167 | 2 | 171 | 0 | 0 | 2 | 2 | 324 |
| 08:30 | 0 | 142 | 17 | 159 | 3 | 0 | 1 | 4 | 6 | 151 | 1 | 158 | 0 | 0 | 0 | 0 | 321 |
| 08:45 | 0 | 153 | 18 | 171 | 8 | 0 | 3 | 11 | 10 | 150 | 0 | 160 | 1 | 0 | 0 | 1 | 343 |
| Total | 1 | 582 | 61 | 644 | 17 | 0 | 6 | 23 | 21 | 667 | 4 | 692 | 1 | 0 | 2 | 3 | 1362 |
| Grand Total | 6 | 1159 | 90 | 1255 | 33 | 0 | 13 | 46 | 31 | 1330 | 6 | 1367 | 1 | 2 | 3 | 6 | 2674 |
| Apprch % | 0.5 | 92.4 | 7.2 | | 71.7 | 0 | 28.3 | | 2.3 | 97.3 | 0.4 | | 16.7 | 33.3 | 50 | | |
| Total % | 0.2 | 43.3 | 3.4 | 46.9 | 1.2 | 0 | 0.5 | 1.7 | 1.2 | 49.7 | 0.2 | 51.1 | 0 | 0.1 | 0.1 | 0.2 | |

| Start Time | MERCED ST Southbound | | | | WELLS FARGO D/W Westbound | | | | MERCED ST Northbound | | | | DAL TILE D/W Eastbound | | | | Int. Total |
|------------|-------------------------|----|----|------------|------------------------------|----|----|------------|-------------------------|----|----|------------|---------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30

| | | | | | | | | | | | | | | | | | |
|---------------------|----------|------------|-----------|------------|-----------|----------|----------|-----------|----------|------------|----------|------------|----------|----------|----------|----------|-------------|
| 07:30 | 2 | 152 | 11 | 165 | 4 | 0 | 1 | 5 | 1 | 187 | 0 | 188 | 0 | 0 | 1 | 1 | 359 |
| 07:45 | 2 | 172 | 3 | 177 | 5 | 0 | 2 | 7 | 1 | 182 | 1 | 184 | 0 | 2 | 0 | 2 | 370 |
| 08:00 | 0 | 156 | 11 | 167 | 3 | 0 | 1 | 4 | 3 | 199 | 1 | 203 | 0 | 0 | 0 | 0 | 374 |
| 08:15 | 1 | 131 | 15 | 147 | 3 | 0 | 1 | 4 | 2 | 167 | 2 | 171 | 0 | 0 | 2 | 2 | 324 |
| Total Volume | 5 | 611 | 40 | 656 | 15 | 0 | 5 | 20 | 7 | 735 | 4 | 746 | 0 | 2 | 3 | 5 | 1427 |
| % App. Total | 0.8 | 93.1 | 6.1 | | 75 | 0 | 25 | | 0.9 | 98.5 | 0.5 | | 0 | 40 | 60 | | |
| PHF | .625 | .888 | .667 | .927 | .750 | .000 | .625 | .714 | .583 | .923 | .500 | .919 | .000 | .250 | .375 | .625 | .954 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-well fargo-p
Site Code : 23
Start Date : 1/23/2013
Page No : 1

Groups Printed- Vehicles Only

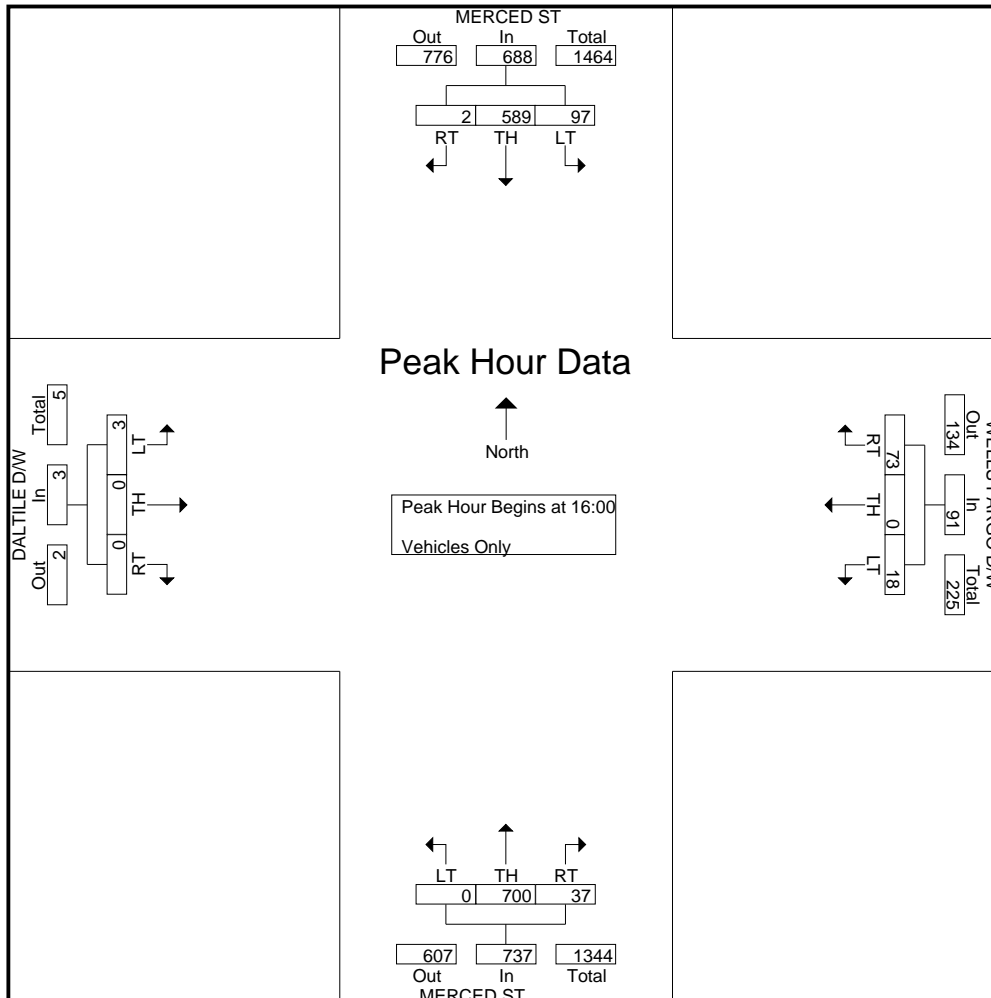
| Start Time | MERCED ST Southbound | | | | WELLS FARGO D/W Westbound | | | | MERCED ST Northbound | | | | DALTILE D/W Eastbound | | | | Int. Total |
|--------------------|-------------------------|-------------|------------|-------------|------------------------------|----------|-----------|------------|-------------------------|-------------|----------|-------------|--------------------------|----------|----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 1 | 162 | 16 | 179 | 20 | 0 | 2 | 22 | 12 | 209 | 0 | 221 | 0 | 0 | 2 | 2 | 424 |
| 16:15 | 0 | 150 | 26 | 176 | 16 | 0 | 9 | 25 | 7 | 153 | 0 | 160 | 0 | 0 | 0 | 0 | 361 |
| 16:30 | 1 | 152 | 27 | 180 | 22 | 0 | 5 | 27 | 8 | 175 | 0 | 183 | 0 | 0 | 1 | 1 | 391 |
| 16:45 | 0 | 125 | 28 | 153 | 15 | 0 | 2 | 17 | 10 | 163 | 0 | 173 | 0 | 0 | 0 | 0 | 343 |
| Total | 2 | 589 | 97 | 688 | 73 | 0 | 18 | 91 | 37 | 700 | 0 | 737 | 0 | 0 | 3 | 3 | 1519 |
| 17:00 | 0 | 145 | 28 | 173 | 14 | 0 | 11 | 25 | 8 | 177 | 1 | 186 | 0 | 0 | 0 | 0 | 384 |
| 17:15 | 0 | 141 | 20 | 161 | 12 | 0 | 6 | 18 | 6 | 144 | 0 | 150 | 0 | 0 | 0 | 0 | 329 |
| 17:30 | 0 | 146 | 20 | 166 | 11 | 0 | 5 | 16 | 9 | 145 | 0 | 154 | 0 | 0 | 0 | 0 | 336 |
| 17:45 | 0 | 158 | 18 | 176 | 12 | 0 | 4 | 16 | 5 | 115 | 0 | 120 | 0 | 0 | 0 | 0 | 312 |
| Total | 0 | 590 | 86 | 676 | 49 | 0 | 26 | 75 | 28 | 581 | 1 | 610 | 0 | 0 | 0 | 0 | 1361 |
| Grand Total | 2 | 1179 | 183 | 1364 | 122 | 0 | 44 | 166 | 65 | 1281 | 1 | 1347 | 0 | 0 | 3 | 3 | 2880 |
| Apprch % | 0.1 | 86.4 | 13.4 | | 73.5 | 0 | 26.5 | | 4.8 | 95.1 | 0.1 | | 0 | 0 | 100 | | |
| Total % | 0.1 | 40.9 | 6.4 | 47.4 | 4.2 | 0 | 1.5 | 5.8 | 2.3 | 44.5 | 0 | 46.8 | 0 | 0 | 0.1 | 0.1 | |

| Start Time | MERCED ST Southbound | | | | WELLS FARGO D/W Westbound | | | | MERCED ST Northbound | | | | DALTILE D/W Eastbound | | | | Int. Total |
|------------|-------------------------|----|----|------------|------------------------------|----|----|------------|-------------------------|----|----|------------|--------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:00

| | | | | | | | | | | | | | | | | | |
|---------------------|----------|------------|-----------|------------|-----------|----------|-----------|-----------|-----------|------------|----------|------------|----------|----------|----------|----------|-------------|
| 16:00 | 1 | 162 | 16 | 179 | 20 | 0 | 2 | 22 | 12 | 209 | 0 | 221 | 0 | 0 | 2 | 2 | 424 |
| 16:15 | 0 | 150 | 26 | 176 | 16 | 0 | 9 | 25 | 7 | 153 | 0 | 160 | 0 | 0 | 0 | 0 | 361 |
| 16:30 | 1 | 152 | 27 | 180 | 22 | 0 | 5 | 27 | 8 | 175 | 0 | 183 | 0 | 0 | 1 | 1 | 391 |
| 16:45 | 0 | 125 | 28 | 153 | 15 | 0 | 2 | 17 | 10 | 163 | 0 | 173 | 0 | 0 | 0 | 0 | 343 |
| Total Volume | 2 | 589 | 97 | 688 | 73 | 0 | 18 | 91 | 37 | 700 | 0 | 737 | 0 | 0 | 3 | 3 | 1519 |
| % App. Total | 0.3 | 85.6 | 14.1 | | 80.2 | 0 | 19.8 | | 5 | 95 | 0 | | 0 | 0 | 100 | | |
| PHF | .500 | .909 | .866 | .956 | .830 | .000 | .500 | .843 | .771 | .837 | .000 | .834 | .000 | .000 | .375 | .375 | .896 |



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-wells fargo-s
Site Code : 23
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MERCED ST Southbound | | | | WELLS FARGO D/W Westbound | | | | MERCED ST Northbound | | | | DAL TILE D/W Eastbound | | | | Int. Total |
|--------------------|----------------------|-------------|------------|-------------|---------------------------|----------|------------|------------|----------------------|-------------|----------|-------------|------------------------|----------|----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 0 | 99 | 37 | 136 | 15 | 0 | 6 | 21 | 11 | 123 | 1 | 135 | 0 | 0 | 0 | 0 | 292 |
| 10:15 | 1 | 93 | 48 | 142 | 18 | 0 | 7 | 25 | 9 | 109 | 0 | 118 | 0 | 0 | 0 | 0 | 285 |
| 10:30 | 0 | 81 | 45 | 126 | 23 | 0 | 5 | 28 | 11 | 119 | 0 | 130 | 0 | 0 | 0 | 0 | 284 |
| 10:45 | 0 | 108 | 45 | 153 | 22 | 0 | 12 | 34 | 7 | 126 | 0 | 133 | 0 | 0 | 0 | 0 | 320 |
| Total | 1 | 381 | 175 | 557 | 78 | 0 | 30 | 108 | 38 | 477 | 1 | 516 | 0 | 0 | 0 | 0 | 1181 |
| 11:00 | 0 | 108 | 37 | 145 | 13 | 0 | 11 | 24 | 11 | 141 | 0 | 152 | 0 | 0 | 0 | 0 | 321 |
| 11:15 | 0 | 111 | 57 | 168 | 24 | 0 | 11 | 35 | 7 | 121 | 0 | 128 | 0 | 0 | 0 | 0 | 331 |
| 11:30 | 2 | 86 | 52 | 140 | 23 | 0 | 8 | 31 | 6 | 138 | 0 | 144 | 0 | 0 | 0 | 0 | 315 |
| 11:45 | 0 | 132 | 51 | 183 | 34 | 0 | 10 | 44 | 11 | 142 | 0 | 153 | 0 | 0 | 0 | 0 | 380 |
| Total | 2 | 437 | 197 | 636 | 94 | 0 | 40 | 134 | 35 | 542 | 0 | 577 | 0 | 0 | 0 | 0 | 1347 |
| 12:00 | 0 | 108 | 33 | 141 | 30 | 0 | 4 | 34 | 12 | 130 | 0 | 142 | 0 | 0 | 1 | 1 | 318 |
| 12:15 | 0 | 119 | 37 | 156 | 21 | 0 | 7 | 28 | 7 | 131 | 0 | 138 | 0 | 0 | 0 | 0 | 322 |
| 12:30 | 0 | 95 | 35 | 130 | 22 | 0 | 9 | 31 | 14 | 146 | 0 | 160 | 0 | 0 | 0 | 0 | 321 |
| 12:45 | 0 | 99 | 37 | 136 | 28 | 0 | 10 | 38 | 15 | 153 | 0 | 168 | 0 | 0 | 0 | 0 | 342 |
| Total | 0 | 421 | 142 | 563 | 101 | 0 | 30 | 131 | 48 | 560 | 0 | 608 | 0 | 0 | 1 | 1 | 1303 |
| 13:00 | 0 | 132 | 37 | 169 | 29 | 0 | 5 | 34 | 9 | 148 | 0 | 157 | 0 | 0 | 0 | 0 | 360 |
| 13:15 | 1 | 131 | 37 | 169 | 22 | 0 | 6 | 28 | 11 | 138 | 0 | 149 | 0 | 0 | 0 | 0 | 346 |
| 13:30 | 0 | 101 | 32 | 133 | 23 | 0 | 9 | 32 | 10 | 135 | 0 | 145 | 0 | 0 | 0 | 0 | 310 |
| 13:45 | 0 | 121 | 24 | 145 | 22 | 0 | 4 | 26 | 4 | 111 | 0 | 115 | 0 | 0 | 0 | 0 | 286 |
| Total | 1 | 485 | 130 | 616 | 96 | 0 | 24 | 120 | 34 | 532 | 0 | 566 | 0 | 0 | 0 | 0 | 1302 |
| Grand Total | 4 | 1724 | 644 | 2372 | 369 | 0 | 124 | 493 | 155 | 2111 | 1 | 2267 | 0 | 0 | 1 | 1 | 5133 |
| Apprch % | 0.2 | 72.7 | 27.2 | | 74.8 | 0 | 25.2 | | 6.8 | 93.1 | 0 | | 0 | 0 | 100 | | |
| Total % | 0.1 | 33.6 | 12.5 | 46.2 | 7.2 | 0 | 2.4 | 9.6 | 3 | 41.1 | 0 | 44.2 | 0 | 0 | 0 | 0 | |

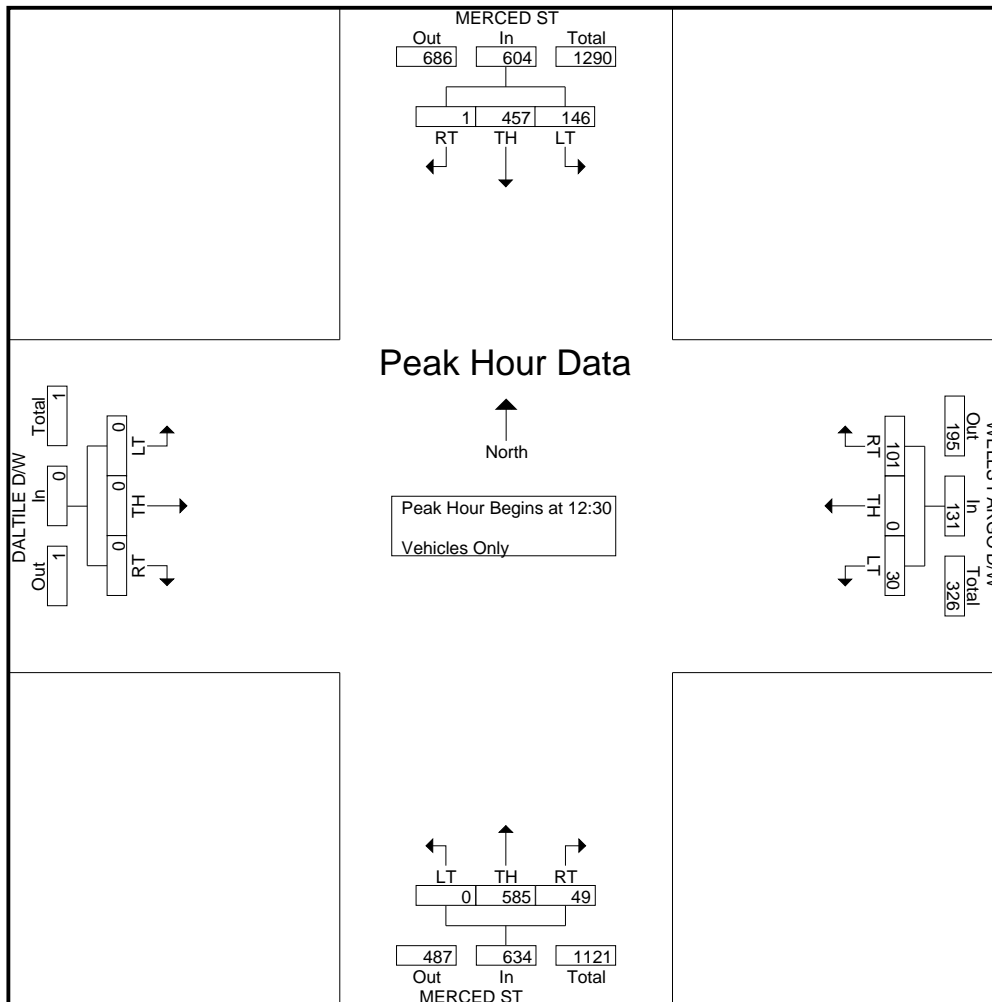
| Start Time | MERCED ST Southbound | | | | WELLS FARGO D/W Westbound | | | | MERCED ST Northbound | | | | DAL TILE D/W Eastbound | | | | Int. Total |
|--|----------------------|-------------|-------------|-------------|---------------------------|-------------|-------------|-------------|----------------------|-------------|-------------|-------------|------------------------|-------------|-------------|-------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:30 | | | | | | | | | | | | | | | | | |
| 12:30 | 0 | 95 | 35 | 130 | 22 | 0 | 9 | 31 | 14 | 146 | 0 | 160 | 0 | 0 | 0 | 0 | 321 |
| 12:45 | 0 | 99 | 37 | 136 | 28 | 0 | 10 | 38 | 15 | 153 | 0 | 168 | 0 | 0 | 0 | 0 | 342 |
| 13:00 | 0 | 132 | 37 | 169 | 29 | 0 | 5 | 34 | 9 | 148 | 0 | 157 | 0 | 0 | 0 | 0 | 360 |
| 13:15 | 1 | 131 | 37 | 169 | 22 | 0 | 6 | 28 | 11 | 138 | 0 | 149 | 0 | 0 | 0 | 0 | 346 |
| Total Volume | 1 | 457 | 146 | 604 | 101 | 0 | 30 | 131 | 49 | 585 | 0 | 634 | 0 | 0 | 0 | 0 | 1369 |
| % App. Total | 0.2 | 75.7 | 24.2 | | 77.1 | 0 | 22.9 | | 7.7 | 92.3 | 0 | | 0 | 0 | 0 | | |
| PHF | .250 | .866 | .986 | .893 | .871 | .000 | .750 | .862 | .817 | .956 | .000 | .943 | .000 | .000 | .000 | .000 | .951 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

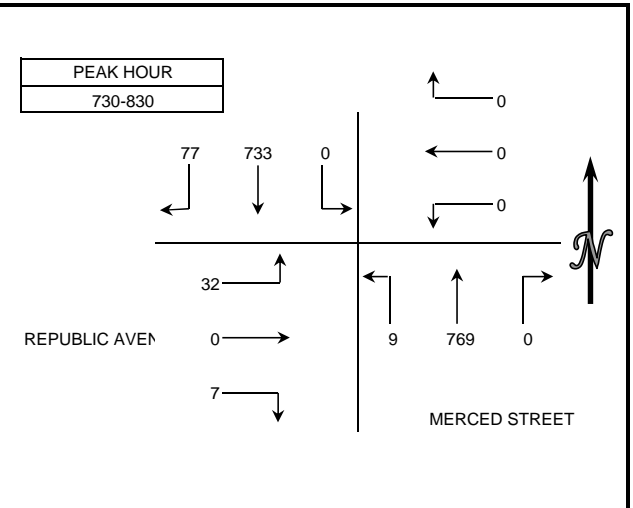
File Name : merced-wells fargo-s
Site Code : 23
Start Date : 2/2/2013
Page No : 2



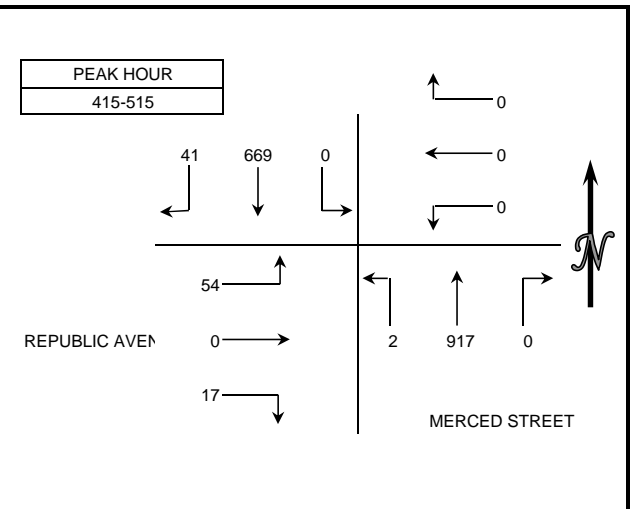
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: PBS&J
 PROJECT: SAN LEANDRO TRAFFIC COUNTS
 DATE: TUESDAY, JUNE 5, 2007
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
 INTERSECTION: N/S MERCED STREET
 E/W REPUBLIC AVENUE
 CITY: SAN LEANDRO

| 15 MIN COUNTS | | | | | | | | | | | | | |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|-------|
| 7:00 AM TO 9:00 AM | | | | | | | | | | | | | |
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 700-715 | 11 | 120 | 0 | 0 | 0 | 0 | 0 | 130 | 2 | 2 | 0 | 10 | 275 |
| 715-730 | 9 | 133 | 0 | 0 | 0 | 0 | 0 | 156 | 2 | 1 | 0 | 8 | 309 |
| 730-745 | 13 | 159 | 0 | 0 | 0 | 0 | 0 | 189 | 0 | 2 | 0 | 14 | 377 |
| 745-800 | 27 | 196 | 0 | 0 | 0 | 0 | 0 | 183 | 6 | 0 | 0 | 6 | 418 |
| 800-815 | 18 | 212 | 0 | 0 | 0 | 0 | 0 | 210 | 2 | 5 | 0 | 5 | 452 |
| 815-830 | 19 | 166 | 0 | 0 | 0 | 0 | 0 | 187 | 1 | 0 | 0 | 7 | 380 |
| 830-845 | 14 | 149 | 0 | 0 | 0 | 0 | 0 | 150 | 2 | 1 | 0 | 4 | 320 |
| 845-900 | 17 | 166 | 0 | 0 | 0 | 0 | 0 | 186 | 1 | 0 | 0 | 5 | 375 |
| HOOR TOTALS | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 700-800 | 60 | 608 | 0 | 0 | 0 | 0 | 0 | 658 | 10 | 5 | 0 | 38 | 1379 |
| 715-815 | 67 | 700 | 0 | 0 | 0 | 0 | 0 | 738 | 10 | 8 | 0 | 33 | 1556 |
| 730-830 | 77 | 733 | 0 | 0 | 0 | 0 | 0 | 769 | 9 | 7 | 0 | 32 | 1627 |
| 745-845 | 78 | 723 | 0 | 0 | 0 | 0 | 0 | 730 | 11 | 6 | 0 | 22 | 1570 |
| 800-900 | 68 | 693 | 0 | 0 | 0 | 0 | 0 | 733 | 6 | 6 | 0 | 21 | 1527 |



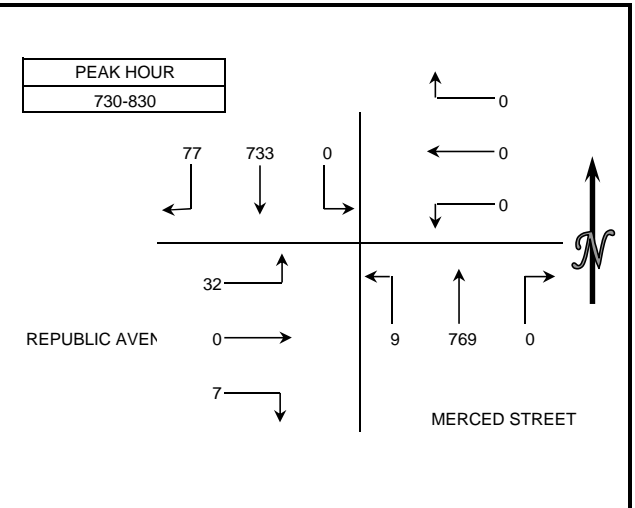
| 15 MIN COUNTS | | | | | | | | | | | | | |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|-------|
| 4:00 PM TO 6:00 PM | | | | | | | | | | | | | |
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 400-415 | 9 | 147 | 0 | 0 | 0 | 0 | 0 | 228 | 0 | 5 | 0 | 25 | 414 |
| 415-430 | 22 | 167 | 0 | 0 | 0 | 0 | 0 | 220 | 2 | 4 | 0 | 11 | 426 |
| 430-445 | 3 | 184 | 0 | 0 | 0 | 0 | 0 | 231 | 0 | 4 | 0 | 19 | 441 |
| 445-500 | 11 | 162 | 0 | 0 | 0 | 0 | 0 | 212 | 0 | 3 | 0 | 7 | 395 |
| 500-515 | 5 | 156 | 0 | 0 | 0 | 0 | 0 | 254 | 0 | 6 | 0 | 17 | 438 |
| 515-530 | 7 | 167 | 0 | 0 | 0 | 0 | 0 | 216 | 0 | 3 | 0 | 8 | 401 |
| 530-545 | 9 | 154 | 0 | 0 | 0 | 0 | 0 | 239 | 0 | 3 | 0 | 8 | 413 |
| 545-600 | 6 | 193 | 0 | 0 | 0 | 0 | 0 | 196 | 0 | 1 | 0 | 5 | 401 |
| HOOR TOTALS | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 400-500 | 45 | 660 | 0 | 0 | 0 | 0 | 0 | 891 | 2 | 16 | 0 | 62 | 1676 |
| 415-515 | 41 | 669 | 0 | 0 | 0 | 0 | 0 | 917 | 2 | 17 | 0 | 54 | 1700 |
| 430-530 | 26 | 669 | 0 | 0 | 0 | 0 | 0 | 913 | 0 | 16 | 0 | 51 | 1675 |
| 445-545 | 32 | 639 | 0 | 0 | 0 | 0 | 0 | 921 | 0 | 15 | 0 | 40 | 1647 |
| 500-600 | 27 | 670 | 0 | 0 | 0 | 0 | 0 | 905 | 0 | 13 | 0 | 38 | 1653 |



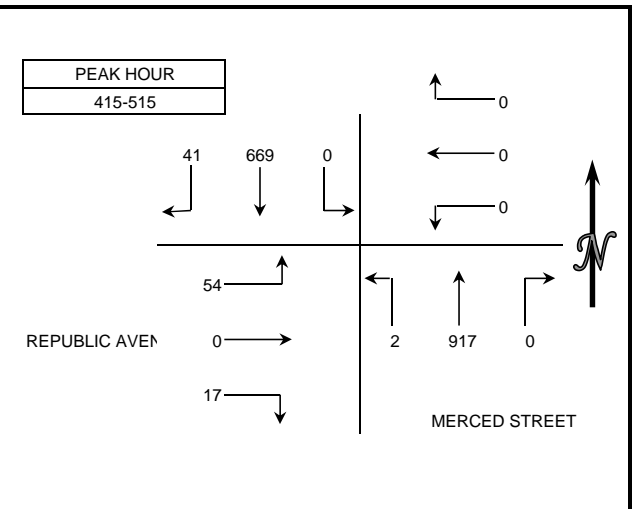
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: PBS&J
 PROJECT: SAN LEANDRO TRAFFIC COUNTS
 DATE: TUESDAY, JUNE 5, 2007
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
 INTERSECTION: N/S MERCED STREET
 E/W REPUBLIC AVENUE
 CITY: SAN LEANDRO

| 15 MIN COUNTS | | | | | | | | | | | | | |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|-------|
| 7:00 AM TO 9:00 AM | | | | | | | | | | | | | |
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 700-715 | 11 | 120 | 0 | 0 | 0 | 0 | 0 | 130 | 2 | 2 | 0 | 10 | 275 |
| 715-730 | 9 | 133 | 0 | 0 | 0 | 0 | 0 | 156 | 2 | 1 | 0 | 8 | 309 |
| 730-745 | 13 | 159 | 0 | 0 | 0 | 0 | 0 | 189 | 0 | 2 | 0 | 14 | 377 |
| 745-800 | 27 | 196 | 0 | 0 | 0 | 0 | 0 | 183 | 6 | 0 | 0 | 6 | 418 |
| 800-815 | 18 | 212 | 0 | 0 | 0 | 0 | 0 | 210 | 2 | 5 | 0 | 5 | 452 |
| 815-830 | 19 | 166 | 0 | 0 | 0 | 0 | 0 | 187 | 1 | 0 | 0 | 7 | 380 |
| 830-845 | 14 | 149 | 0 | 0 | 0 | 0 | 0 | 150 | 2 | 1 | 0 | 4 | 320 |
| 845-900 | 17 | 166 | 0 | 0 | 0 | 0 | 0 | 186 | 1 | 0 | 0 | 5 | 375 |
| HOOR TOTALS | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 700-800 | 60 | 608 | 0 | 0 | 0 | 0 | 0 | 658 | 10 | 5 | 0 | 38 | 1379 |
| 715-815 | 67 | 700 | 0 | 0 | 0 | 0 | 0 | 738 | 10 | 8 | 0 | 33 | 1556 |
| 730-830 | 77 | 733 | 0 | 0 | 0 | 0 | 0 | 769 | 9 | 7 | 0 | 32 | 1627 |
| 745-845 | 78 | 723 | 0 | 0 | 0 | 0 | 0 | 730 | 11 | 6 | 0 | 22 | 1570 |
| 800-900 | 68 | 693 | 0 | 0 | 0 | 0 | 0 | 733 | 6 | 6 | 0 | 21 | 1527 |



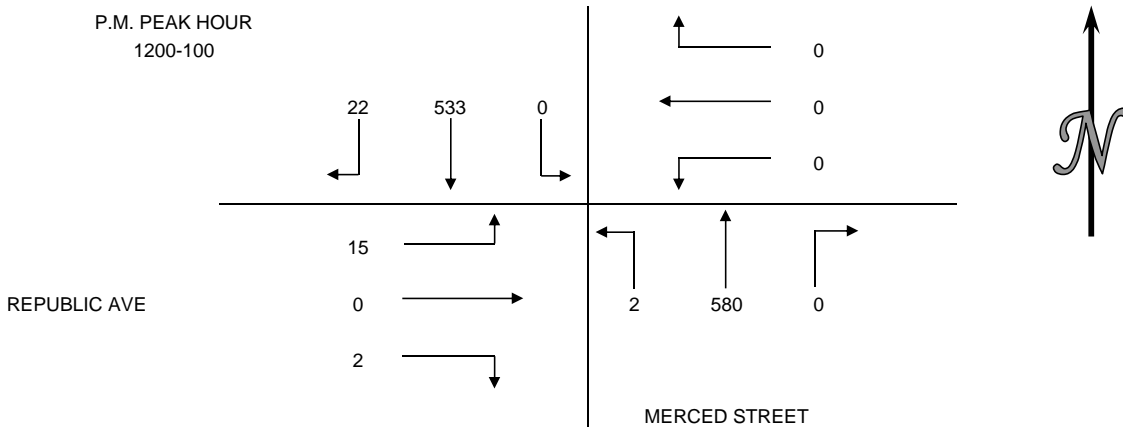
| 15 MIN COUNTS | | | | | | | | | | | | | |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|-------|
| 4:00 PM TO 6:00 PM | | | | | | | | | | | | | |
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 400-415 | 9 | 147 | 0 | 0 | 0 | 0 | 0 | 228 | 0 | 5 | 0 | 25 | 414 |
| 415-430 | 22 | 167 | 0 | 0 | 0 | 0 | 0 | 220 | 2 | 4 | 0 | 11 | 426 |
| 430-445 | 3 | 184 | 0 | 0 | 0 | 0 | 0 | 231 | 0 | 4 | 0 | 19 | 441 |
| 445-500 | 11 | 162 | 0 | 0 | 0 | 0 | 0 | 212 | 0 | 3 | 0 | 7 | 395 |
| 500-515 | 5 | 156 | 0 | 0 | 0 | 0 | 0 | 254 | 0 | 6 | 0 | 17 | 438 |
| 515-530 | 7 | 167 | 0 | 0 | 0 | 0 | 0 | 216 | 0 | 3 | 0 | 8 | 401 |
| 530-545 | 9 | 154 | 0 | 0 | 0 | 0 | 0 | 239 | 0 | 3 | 0 | 8 | 413 |
| 545-600 | 6 | 193 | 0 | 0 | 0 | 0 | 0 | 196 | 0 | 1 | 0 | 5 | 401 |
| HOOR TOTALS | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 400-500 | 45 | 660 | 0 | 0 | 0 | 0 | 0 | 891 | 2 | 16 | 0 | 62 | 1676 |
| 415-515 | 41 | 669 | 0 | 0 | 0 | 0 | 0 | 917 | 2 | 17 | 0 | 54 | 1700 |
| 430-530 | 26 | 669 | 0 | 0 | 0 | 0 | 0 | 913 | 0 | 16 | 0 | 51 | 1675 |
| 445-545 | 32 | 639 | 0 | 0 | 0 | 0 | 0 | 921 | 0 | 15 | 0 | 40 | 1647 |
| 500-600 | 27 | 670 | 0 | 0 | 0 | 0 | 0 | 905 | 0 | 13 | 0 | 38 | 1653 |



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: PBS&J
 PROJECT: SAN LEANDRO TRAFFIC COUNTS
 DATE: SATURDAY, JUNE 9, 2007
 PERIOD: 11:00 PM TO 2:00 PM
 INTERSECTION: N/S MERCED STREET
 E/W REPUBLIC AVE

| 15 MIN COUNTS | | | | | | | | | | | | | |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|-------|
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 1100-1115 | 7 | 118 | 0 | 0 | 0 | 0 | 0 | 149 | 0 | 0 | 0 | 5 | 279 |
| 1115-1130 | 6 | 138 | 0 | 0 | 0 | 0 | 0 | 154 | 4 | 0 | 0 | 4 | 306 |
| 1130-1145 | 7 | 126 | 0 | 0 | 0 | 0 | 0 | 129 | 0 | 2 | 0 | 5 | 269 |
| 1145-1200 | 5 | 117 | 0 | 0 | 0 | 0 | 0 | 143 | 0 | 0 | 0 | 3 | 268 |
| 1200-1215 | 6 | 133 | 0 | 0 | 0 | 0 | 0 | 141 | 0 | 1 | 0 | 4 | 285 |
| 1215-1230 | 2 | 132 | 0 | 0 | 0 | 0 | 0 | 150 | 0 | 0 | 0 | 5 | 289 |
| 1230-1245 | 8 | 124 | 0 | 0 | 0 | 0 | 0 | 157 | 1 | 1 | 0 | 2 | 293 |
| 1245-100 | 6 | 144 | 0 | 0 | 0 | 0 | 0 | 132 | 1 | 0 | 0 | 4 | 287 |
| 100-115 | 6 | 131 | 0 | 0 | 0 | 0 | 0 | 123 | 0 | 1 | 0 | 1 | 262 |
| 115-130 | 7 | 139 | 0 | 0 | 0 | 0 | 0 | 141 | 0 | 2 | 0 | 3 | 292 |
| 130-145 | 6 | 115 | 0 | 0 | 0 | 0 | 0 | 121 | 3 | 3 | 0 | 7 | 255 |
| 145-200 | 2 | 124 | 0 | 0 | 0 | 0 | 0 | 157 | 0 | 3 | 0 | 4 | 290 |
| HOUR TOTALS | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 1100-1200 | 25 | 499 | 0 | 0 | 0 | 0 | 0 | 575 | 4 | 2 | 0 | 17 | 1122 |
| 1115-1215 | 24 | 514 | 0 | 0 | 0 | 0 | 0 | 567 | 4 | 3 | 0 | 16 | 1128 |
| 1130-1230 | 20 | 508 | 0 | 0 | 0 | 0 | 0 | 563 | 0 | 3 | 0 | 17 | 1111 |
| 1145-1245 | 21 | 506 | 0 | 0 | 0 | 0 | 0 | 591 | 1 | 2 | 0 | 14 | 1135 |
| 1200-100 | 22 | 533 | 0 | 0 | 0 | 0 | 0 | 580 | 2 | 2 | 0 | 15 | 1154 |
| 1215-115 | 22 | 531 | 0 | 0 | 0 | 0 | 0 | 562 | 2 | 2 | 0 | 12 | 1131 |
| 1230-130 | 27 | 538 | 0 | 0 | 0 | 0 | 0 | 553 | 2 | 4 | 0 | 10 | 1134 |
| 1245-145 | 25 | 529 | 0 | 0 | 0 | 0 | 0 | 517 | 4 | 6 | 0 | 15 | 1096 |
| 100-200 | 21 | 509 | 0 | 0 | 0 | 0 | 0 | 542 | 3 | 9 | 0 | 15 | 1099 |



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

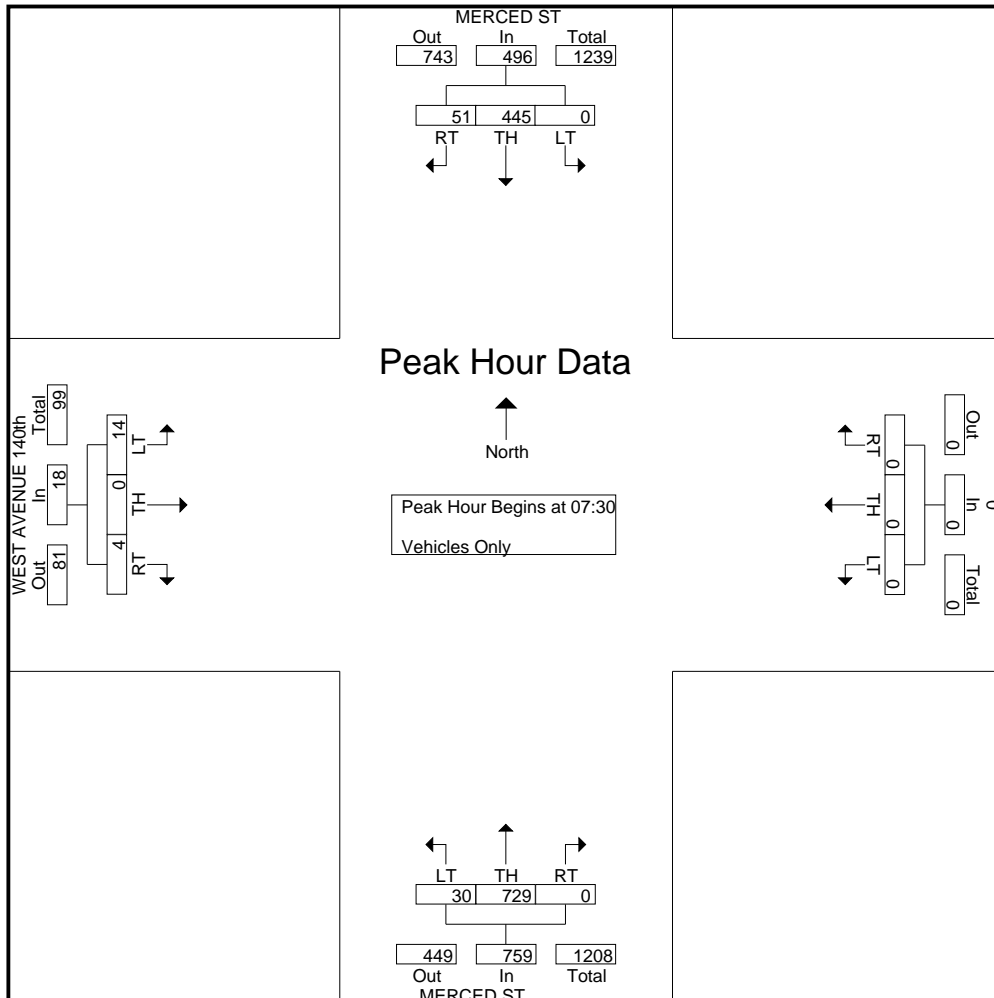
File Name : merced-140-a
Site Code : 19
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MERCED ST Southbound | | | | 0 Westbound | | | | MERCED ST Northbound | | | | WEST AVENUE 140th Eastbound | | | | Int. Total |
|--------------|----------------------|------------|----------|------------|-------------|----------|----------|------------|----------------------|------------|-----------|------------|-----------------------------|----------|-----------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 8 | 69 | 0 | 77 | 0 | 0 | 0 | 0 | 0 | 113 | 2 | 115 | 0 | 0 | 4 | 4 | 196 |
| 07:15 | 7 | 78 | 0 | 85 | 0 | 0 | 0 | 0 | 0 | 151 | 0 | 151 | 0 | 0 | 2 | 2 | 238 |
| 07:30 | 10 | 90 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 165 | 7 | 172 | 2 | 0 | 3 | 5 | 277 |
| 07:45 | 27 | 121 | 0 | 148 | 0 | 0 | 0 | 0 | 0 | 198 | 11 | 209 | 1 | 0 | 5 | 6 | 363 |
| Total | 52 | 358 | 0 | 410 | 0 | 0 | 0 | 0 | 0 | 627 | 20 | 647 | 3 | 0 | 14 | 17 | 1074 |
| 08:00 | 6 | 135 | 0 | 141 | 0 | 0 | 0 | 0 | 0 | 216 | 5 | 221 | 1 | 0 | 1 | 2 | 364 |
| 08:15 | 8 | 99 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 150 | 7 | 157 | 0 | 0 | 5 | 5 | 269 |
| 08:30 | 6 | 95 | 0 | 101 | 0 | 0 | 0 | 0 | 0 | 125 | 6 | 131 | 0 | 0 | 3 | 3 | 235 |
| 08:45 | 10 | 69 | 0 | 79 | 0 | 0 | 0 | 0 | 0 | 139 | 7 | 146 | 2 | 0 | 10 | 12 | 237 |
| Total | 30 | 398 | 0 | 428 | 0 | 0 | 0 | 0 | 0 | 630 | 25 | 655 | 3 | 0 | 19 | 22 | 1105 |
| Grand Total | 82 | 756 | 0 | 838 | 0 | 0 | 0 | 0 | 0 | 1257 | 45 | 1302 | 6 | 0 | 33 | 39 | 2179 |
| Apprch % | 9.8 | 90.2 | 0 | | 0 | 0 | 0 | | 0 | 96.5 | 3.5 | | 15.4 | 0 | 84.6 | | |
| Total % | 3.8 | 34.7 | 0 | 38.5 | 0 | 0 | 0 | 0 | 0 | 57.7 | 2.1 | 59.8 | 0.3 | 0 | 1.5 | 1.8 | |

| Start Time | MERCED ST Southbound | | | | 0 Westbound | | | | MERCED ST Northbound | | | | WEST AVENUE 140th Eastbound | | | | Int. Total |
|--------------|----------------------|------|------|------------|-------------|------|------|------------|----------------------|------|------|------------|-----------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:30 | 10 | 90 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 165 | 7 | 172 | 2 | 0 | 3 | 5 | 277 |
| 07:45 | 27 | 121 | 0 | 148 | 0 | 0 | 0 | 0 | 0 | 198 | 11 | 209 | 1 | 0 | 5 | 6 | 363 |
| 08:00 | 6 | 135 | 0 | 141 | 0 | 0 | 0 | 0 | 0 | 216 | 5 | 221 | 1 | 0 | 1 | 2 | 364 |
| 08:15 | 8 | 99 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 150 | 7 | 157 | 0 | 0 | 5 | 5 | 269 |
| Total Volume | 51 | 445 | 0 | 496 | 0 | 0 | 0 | 0 | 0 | 729 | 30 | 759 | 4 | 0 | 14 | 18 | 1273 |
| % App. Total | 10.3 | 89.7 | 0 | | 0 | 0 | 0 | | 0 | 96 | 4 | | 22.2 | 0 | 77.8 | | |
| PHF | .472 | .824 | .000 | .838 | .000 | .000 | .000 | .000 | .000 | .844 | .682 | .859 | .500 | .000 | .700 | .750 | .874 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30



MARKS TRAFFIC DATA

mietekm@comcast.net
916.806.0250

CITY OF SAN LEANDRO
Shoreline EIR

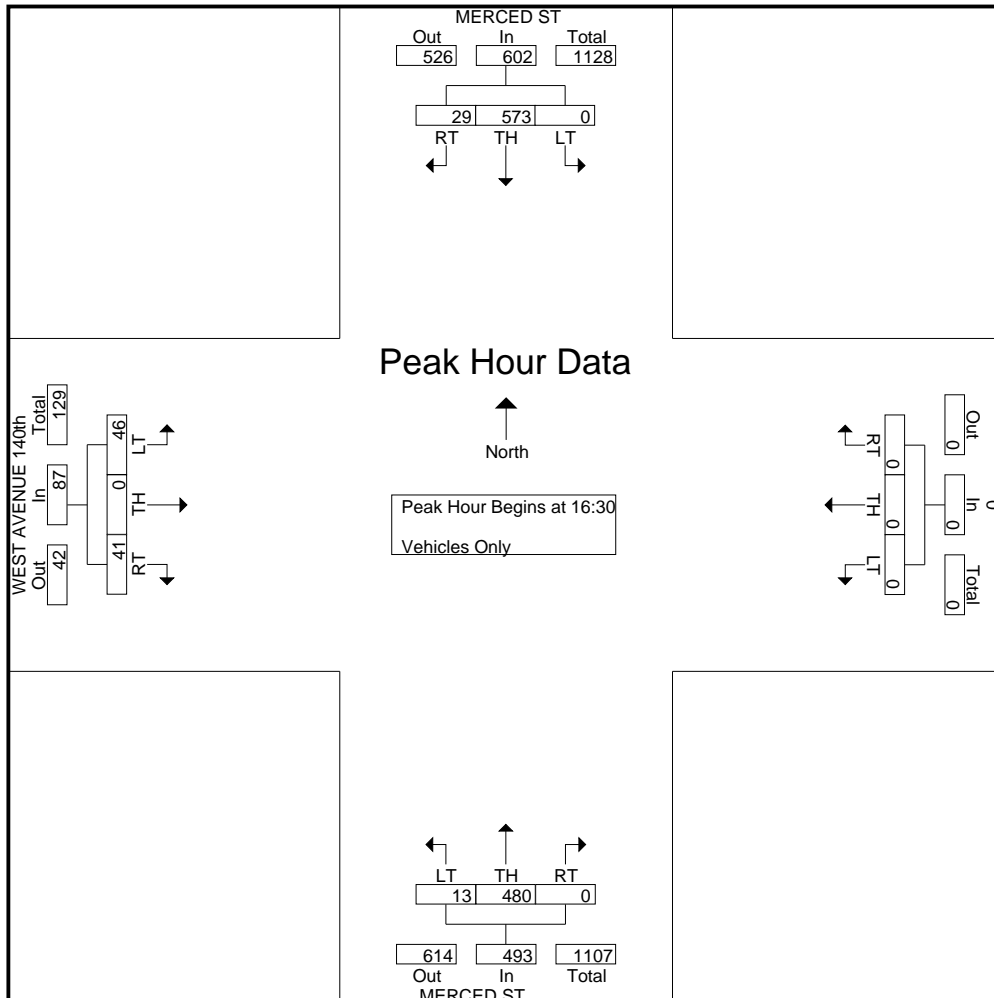
File Name : merced-140-p
Site Code : 19
Start Date : 1/24/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MERCED ST Southbound | | | | 0 Westbound | | | | MERCED ST Northbound | | | | WEST AVENUE 140th Eastbound | | | | Int. Total |
|--------------------|----------------------|-------------|----------|-------------|-------------|----------|----------|------------|----------------------|------------|-----------|------------|-----------------------------|----------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 16 | 126 | 0 | 142 | 0 | 0 | 0 | 0 | 0 | 120 | 0 | 120 | 20 | 0 | 38 | 58 | 320 |
| 16:15 | 11 | 128 | 0 | 139 | 0 | 0 | 0 | 0 | 0 | 96 | 4 | 100 | 13 | 0 | 23 | 36 | 275 |
| 16:30 | 10 | 116 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 121 | 4 | 125 | 7 | 0 | 11 | 18 | 269 |
| 16:45 | 9 | 139 | 0 | 148 | 0 | 0 | 0 | 0 | 0 | 104 | 4 | 108 | 9 | 0 | 15 | 24 | 280 |
| Total | 46 | 509 | 0 | 555 | 0 | 0 | 0 | 0 | 0 | 441 | 12 | 453 | 49 | 0 | 87 | 136 | 1144 |
| 17:00 | 5 | 164 | 0 | 169 | 0 | 0 | 0 | 0 | 0 | 141 | 2 | 143 | 19 | 0 | 11 | 30 | 342 |
| 17:15 | 5 | 154 | 0 | 159 | 0 | 0 | 0 | 0 | 0 | 114 | 3 | 117 | 6 | 0 | 9 | 15 | 291 |
| 17:30 | 6 | 152 | 0 | 158 | 0 | 0 | 0 | 0 | 0 | 90 | 0 | 90 | 3 | 0 | 10 | 13 | 261 |
| 17:45 | 3 | 182 | 0 | 185 | 0 | 0 | 0 | 0 | 0 | 88 | 1 | 89 | 6 | 0 | 7 | 13 | 287 |
| Total | 19 | 652 | 0 | 671 | 0 | 0 | 0 | 0 | 0 | 433 | 6 | 439 | 34 | 0 | 37 | 71 | 1181 |
| Grand Total | 65 | 1161 | 0 | 1226 | 0 | 0 | 0 | 0 | 0 | 874 | 18 | 892 | 83 | 0 | 124 | 207 | 2325 |
| Apprch % | 5.3 | 94.7 | 0 | | 0 | 0 | 0 | | 0 | 98 | 2 | | 40.1 | 0 | 59.9 | | |
| Total % | 2.8 | 49.9 | 0 | 52.7 | 0 | 0 | 0 | | 0 | 37.6 | 0.8 | 38.4 | 3.6 | 0 | 5.3 | 8.9 | |

| Start Time | MERCED ST Southbound | | | | 0 Westbound | | | | MERCED ST Northbound | | | | WEST AVENUE 140th Eastbound | | | | Int. Total |
|---------------------|----------------------|------------|------|------------|-------------|------|------|------------|----------------------|------------|----------|------------|-----------------------------|------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:30 | 10 | 116 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 121 | 4 | 125 | 7 | 0 | 11 | 18 | 269 |
| 16:45 | 9 | 139 | 0 | 148 | 0 | 0 | 0 | 0 | 0 | 104 | 4 | 108 | 9 | 0 | 15 | 24 | 280 |
| 17:00 | 5 | 164 | 0 | 169 | 0 | 0 | 0 | 0 | 0 | 141 | 2 | 143 | 19 | 0 | 11 | 30 | 342 |
| 17:15 | 5 | 154 | 0 | 159 | 0 | 0 | 0 | 0 | 0 | 114 | 3 | 117 | 6 | 0 | 9 | 15 | 291 |
| Total Volume | 29 | 573 | 0 | 602 | 0 | 0 | 0 | 0 | 0 | 480 | 13 | 493 | 41 | 0 | 46 | 87 | 1182 |
| % App. Total | 4.8 | 95.2 | 0 | | 0 | 0 | 0 | | 0 | 97.4 | 2.6 | | 47.1 | 0 | 52.9 | | |
| PHF | .725 | .873 | .000 | .891 | .000 | .000 | .000 | .000 | .000 | .851 | .813 | .862 | .539 | .000 | .767 | .725 | .864 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:30



MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-140-s
Site Code : 19
Start Date : 2/2/2013
Page No : 1

Groups Printed- Vehicles Only

| Start Time | MERCED BLVD Southbound | | | | 0 Westbound | | | | MERCED BLVD Northbound | | | | WEST AVENUE 140th Eastbound | | | | Int. Total |
|--------------------|---------------------------|-------------|----------|-------------|----------------|----------|----------|------------|---------------------------|-------------|------------|-------------|--------------------------------|----------|------------|------------|-------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 10:00 | 8 | 79 | 0 | 87 | 0 | 0 | 0 | 0 | 0 | 104 | 7 | 111 | 2 | 0 | 8 | 10 | 208 |
| 10:15 | 13 | 71 | 0 | 84 | 0 | 0 | 0 | 0 | 0 | 108 | 9 | 117 | 3 | 0 | 7 | 10 | 211 |
| 10:30 | 17 | 53 | 0 | 70 | 0 | 0 | 0 | 0 | 0 | 116 | 2 | 118 | 6 | 0 | 8 | 14 | 202 |
| 10:45 | 18 | 75 | 0 | 93 | 0 | 0 | 0 | 0 | 0 | 113 | 5 | 118 | 2 | 0 | 10 | 12 | 223 |
| Total | 56 | 278 | 0 | 334 | 0 | 0 | 0 | 0 | 0 | 441 | 23 | 464 | 13 | 0 | 33 | 46 | 844 |
| 11:00 | 10 | 93 | 0 | 103 | 0 | 0 | 0 | 0 | 0 | 110 | 9 | 119 | 6 | 0 | 17 | 23 | 245 |
| 11:15 | 21 | 96 | 0 | 117 | 0 | 0 | 0 | 0 | 0 | 101 | 4 | 105 | 3 | 0 | 7 | 10 | 232 |
| 11:30 | 5 | 79 | 0 | 84 | 0 | 0 | 0 | 0 | 0 | 99 | 5 | 104 | 7 | 0 | 8 | 15 | 203 |
| 11:45 | 24 | 91 | 0 | 115 | 0 | 0 | 0 | 0 | 0 | 96 | 4 | 100 | 4 | 0 | 13 | 17 | 232 |
| Total | 60 | 359 | 0 | 419 | 0 | 0 | 0 | 0 | 0 | 406 | 22 | 428 | 20 | 0 | 45 | 65 | 912 |
| 12:00 | 15 | 79 | 0 | 94 | 0 | 0 | 0 | 0 | 0 | 110 | 4 | 114 | 4 | 0 | 21 | 25 | 233 |
| 12:15 | 14 | 93 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 113 | 7 | 120 | 9 | 0 | 12 | 21 | 248 |
| 12:30 | 16 | 73 | 0 | 89 | 0 | 0 | 0 | 0 | 0 | 111 | 10 | 121 | 6 | 0 | 18 | 24 | 234 |
| 12:45 | 24 | 94 | 0 | 118 | 0 | 0 | 0 | 0 | 0 | 105 | 8 | 113 | 5 | 0 | 14 | 19 | 250 |
| Total | 69 | 339 | 0 | 408 | 0 | 0 | 0 | 0 | 0 | 439 | 29 | 468 | 24 | 0 | 65 | 89 | 965 |
| 13:00 | 22 | 91 | 0 | 113 | 0 | 0 | 0 | 0 | 0 | 76 | 8 | 84 | 10 | 0 | 19 | 29 | 226 |
| 13:15 | 21 | 109 | 0 | 130 | 0 | 0 | 0 | 0 | 0 | 96 | 5 | 101 | 13 | 0 | 23 | 36 | 267 |
| 13:30 | 20 | 83 | 0 | 103 | 0 | 0 | 0 | 0 | 0 | 105 | 2 | 107 | 3 | 0 | 18 | 21 | 231 |
| 13:45 | 9 | 101 | 0 | 110 | 0 | 0 | 0 | 0 | 0 | 62 | 12 | 74 | 3 | 0 | 8 | 11 | 195 |
| Total | 72 | 384 | 0 | 456 | 0 | 0 | 0 | 0 | 0 | 339 | 27 | 366 | 29 | 0 | 68 | 97 | 919 |
| Grand Total | 257 | 1360 | 0 | 1617 | 0 | 0 | 0 | 0 | 0 | 1625 | 101 | 1726 | 86 | 0 | 211 | 297 | 3640 |
| Apprch % | 15.9 | 84.1 | 0 | | 0 | 0 | 0 | | 0 | 94.1 | 5.9 | | 29 | 0 | 71 | | |
| Total % | 7.1 | 37.4 | 0 | 44.4 | 0 | 0 | 0 | 0 | 0 | 44.6 | 2.8 | 47.4 | 2.4 | 0 | 5.8 | 8.2 | |

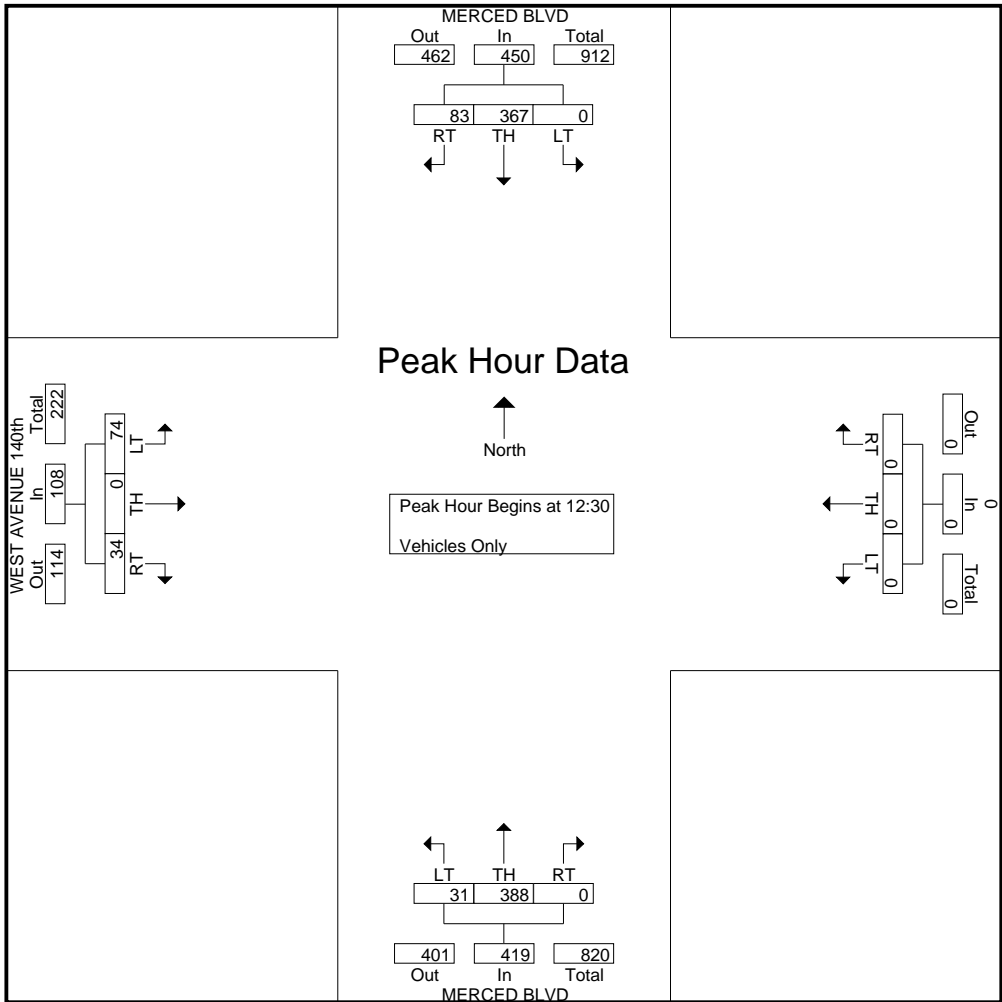
| Start Time | MERCED BLVD Southbound | | | | 0 Westbound | | | | MERCED BLVD Northbound | | | | WEST AVENUE 140th Eastbound | | | | Int. Total |
|--|---------------------------|------------|------|------------|----------------|------|------|------------|---------------------------|------|------|------------|--------------------------------|------|-----------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 10:00 to 13:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:30 | | | | | | | | | | | | | | | | | |
| 12:30 | 16 | 73 | 0 | 89 | 0 | 0 | 0 | 0 | 0 | 111 | 10 | 121 | 6 | 0 | 18 | 24 | 234 |
| 12:45 | 24 | 94 | 0 | 118 | 0 | 0 | 0 | 0 | 0 | 105 | 8 | 113 | 5 | 0 | 14 | 19 | 250 |
| 13:00 | 22 | 91 | 0 | 113 | 0 | 0 | 0 | 0 | 0 | 76 | 8 | 84 | 10 | 0 | 19 | 29 | 226 |
| 13:15 | 21 | 109 | 0 | 130 | 0 | 0 | 0 | 0 | 0 | 96 | 5 | 101 | 13 | 0 | 23 | 36 | 267 |
| Total Volume | 83 | 367 | 0 | 450 | 0 | 0 | 0 | 0 | 0 | 388 | 31 | 419 | 34 | 0 | 74 | 108 | 977 |
| % App. Total | 18.4 | 81.6 | 0 | | 0 | 0 | 0 | | 0 | 92.6 | 7.4 | | 31.5 | 0 | 68.5 | | |
| PHF | .865 | .842 | .000 | .865 | .000 | .000 | .000 | .000 | .000 | .874 | .775 | .866 | .654 | .000 | .804 | .750 | .915 |

MARKS TRAFFIC DATA

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CITY OF SAN LEANDRO
Shoreline EIR

File Name : merced-140-s
Site Code : 19
Start Date : 2/2/2013
Page No : 2



Appendix 8 Socio-Demographic Model Input Data

San Leandro Shoreline - Project Area TAZ Socio-Demographic inputs

Alameda CTC Countywide Model inputs (2014, 2020 & 2035 Inputs)

| Project | Model | | | | | | | total | | | | | | | | Conversion | | | | |
|---------------------------|-------|-------|-------|--------|--------|------|------|-------|--------|--------|--------|-------|--------|--------|-------------------|------------|------|------|-------|-------|
| Land Use | TAZ | TOTHH | HHPOP | TOTPOP | EMPRES | SFHH | MFHH | TEMP | RETEMP | SEREMP | OTHEMP | AGEMP | MANEMP | WHOEMP | Type | Sqft | Rate | Empl | Split | Split |
| South Golf Course Housing | 1437 | 70 | 209 | 209 | 112 | 42 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Housing | | | | | |
| North Golf Course Housing | 1438 | 64 | 141 | 141 | 102 | 0 | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Housing | | | | | |
| North Residential Housing | 1439 | 159 | 350 | 350 | 254 | 0 | 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Housing | | | | | |
| Commercial Office | 1440 | 0 | 0 | 0 | 0 | 0 | 0 | 600 | 0 | 600 | 0 | 0 | 0 | 0 | Office | 150000 | 250 | 600 | | |
| Conf Center | 1441 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 60 | 0 | 0 | 0 | Conf Center | 15000 | 250 | 60 | rest | park |
| Restaurant 1 | 1442 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 64 | 0 | 0 | 0 | 0 | 0 | Restaurant 1/park | 16000 | 250 | 64 | 8000 | 8000 |
| Existing Restaurant | 1443 | | | | | | | | | | | | | | | | | | | |
| Existing Hotel | 1444 | | | | | | | | | | | | | | | | | | | |
| South Mixed Use Flats | 1445 | 61 | 134 | 134 | 98 | 0 | 61 | 24 | 24 | 0 | 0 | 0 | 0 | 0 | retail | 8000 | 333 | 24 | | |
| Restaurant 2 | 1446 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 0 | 0 | 0 | 0 | 0 | Restaurant 2 | 5000 | 250 | 20 | | |
| Hotel | 1447 | 0 | 0 | 0 | 0 | 0 | 0 | 214 | 0 | 107 | 107 | 0 | 0 | 0 | Hotel | 107000 | 500 | 214 | | |
| Park | 1448 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 5 | 5 | 0 | 0 | 0 | Park | 4000 | 400 | 10 | | |
| Library | 1449 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 5 | 5 | 0 | 0 | 0 | Library | 4000 | 400 | 10 | | |

Source: Kittelson & Associates, 2014