

**IMPERIAL STATIONS
31800 MISSION TRAIL
LAKE ELSINORE, CALIFORNIA, 92530**

TRAFFIC IMPACT ANALYSIS

REVISION DATE: June 4, 2021



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LIST OF ABBREVIATED TERMS

[#]	Note
AC	Acres
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CMU	Commercial Mixed Use
DU	Dwelling Unit
EAP	Existing Plus Ambient Plus Project
EAPC	Existing Plus Ambient Plus Project Plus Cumulative
GFA	Gross Floor Area
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
MUTCD	Manual on Uniform Traffic Control Devices
N/A	Not applicable
PHF	Peak Hour Factor
RM	Rooms
RTA	Riverside Transit Authority
SANDAG	San Diego Association of Governments
sf	Square feet
STE	Sierra Transportation Engineers, Inc.
STU	Student
TIA	Traffic Impact Analysis
TSF	Thousand square feet
TWLTL	Two-way left turn lane
TWSC	Two-Way Stop
VFP	Vehicle Fueling Positions

1. INTRODUCTION

Sierra Transportation Engineers, Inc. (STE) has prepared this traffic impact analysis (TIA) for the proposed development located at 31800 Mission Trail in the City of Lake Elsinore (City), California. As directed by City personnel, this TIA has been prepared in accordance with the City of Lake Elsinore Traffic Impact Analysis Preparation Guide, adopted June 23, 2020.

1.A PURPOSE OF TIA AND STUDY OBJECTIVES

The purpose of this study is to assess the potential traffic impacts of the proposed gas station with convenience store and automated car wash development to adjacent roadways in the City. STE prepared and submitted a “Scope Agreement for Traffic Impact Study” to the City prior to preparing this study on October 22, 2020. The City approved the scoping agreement on November 9, 2020. The approved scoping agreement is provided in Appendix A. Based on discussions with City personnel, STE was to study the following scenarios:

- Existing Condition
- Existing Plus Ambient Plus Project Condition (EAP)
- Existing Plus Ambient Plus Project Plus Cumulative Condition (EAPC)

1.B SITE LOCATION AND STUDY AREA EXHIBIT

The proposed development is located at 31800 Mission Trail between the intersections of Diamond Drive & Mission Trail and Malaga Road & Mission Trail on Assessor’s Parcel Number (APN) 363-172-016. The project site is not within any other agency’s boundaries. Figure 1 shows the project location with respect to the existing roadways.

1.C DEVELOPMENT PROJECT IDENTIFICATION

The case number is PA 2017-62 Imperial Stations.

1.D DEVELOPMENT PROJECT DESCRIPTION

1.D.1 Project Description

The project is a gas station with convenience store and automated car wash development. It has 18 fueling positions and an automated car wash with a gross floor area (GFA) of 4,400 square feet (sf). The City requested that the gas station with convenience store be separated from the automated car wash for analysis purposes using the Institute of Transportation Engineers (ITE) Trip Generation Manual for various land uses.

1.D.2 Existing and Proposed Land Uses & Zoning

The following is land use and zoning information for the study area:

- The land use for the project site is Commercial Mixed Use and the zoning is Commercial Mixed Use (CMU). CMU offers a mix of land uses in a compact, high quality, pedestrian-friendly, interactive pattern. This project (i.e., automated car wash) falls within the permissible identified land use.
- The land use and zoning for the area to the immediate north is CMU and has a shopping mall type building called Winston Plaza. There are automotive repair services, restaurant, and dental offices.
- The land use and zoning for the area to the immediate west is CMU and has a shopping mall type building called La Laguna Mercado Shopping Center. There are various services provided in building including jewelers, clothing, flooring, hair dresser, and florist.
- The land use and zoning for the area to the immediate south is CMU and has a shopping mall type building called Mission Trail Center. There are restaurants, nail salon, cleaners, etc.
- The project parcel is in between Mission Trail and Casino Drive. The project access is from Mission Trail only. The land use and zoning for the area to the immediate east is C2 or General Commercial. There is a shopping mall type building with primarily doctor offices and the County of Riverside Mental Health office.

1.D.3 Site Plan of Proposed Project

Exhibit 2 presents the site plan of the project. There are two driveways (i.e., one for entering and one for exiting) along Mission Trail. For analysis purposes and per discussions with the City, the driveways were modeled as one driveway.

1.D.4 Proposed Project Opening Year

Construction of the project will occur in 2021 and the full project opening year will be in 2023. This is not a phased development. For the ambient growth rate, STE used a 2% annual growth factor.



Exhibit 1. Vicinity Map.

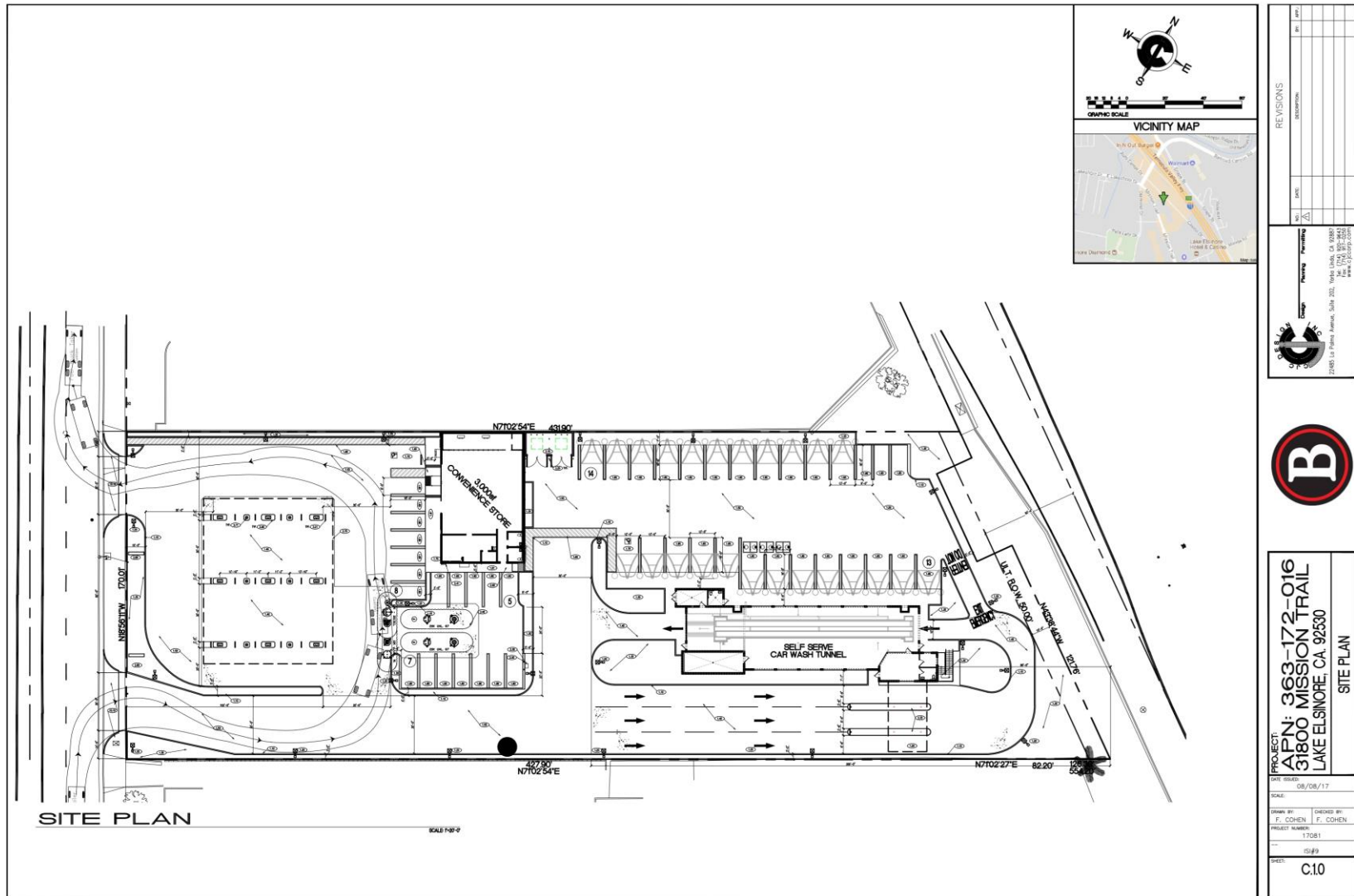


Exhibit 2. Site Plan.

2. METHODOLOGIES

Prior to the discussion of any analyses for the proposed site, STE is presenting the methodologies used in the TIA. These methodologies are consistent with the City's Traffic Impact Analysis Preparation Guide, adopted June 23, 2020.

2.A LEVEL OF SERVICE (LOS)

The intersections are analyzed for capacity based on procedures for signalized and unsignalized intersections presented in the most recent Highway Capacity Manual (HCM 6th Ed.). The result of capacity analysis is a LOS rating for each intersection and driveway. The HCM defines six levels of service for various facility types. The six levels are given letter designations ranging from "A" to "F", with "A" representing the best operating conditions and "F" the worst. Tables 1 and 2 list the six levels of service and their corresponding ranges of average control delay for signalized and unsignalized intersections, respectively.

Table 1. Signalized Intersection LOS Description.

LOS	Signalized Intersection Description	Average Control Delay (seconds)
A	Very favorable progression; most vehicles arrive during green signal and do not stop. Short cycle lengths	0 - 10.00
B	Good progression, short cycle lengths. More vehicles stop than for LOS A.	10.01 – 20.00
C	Fair progression; longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant, though many vehicles still pass through without stopping.	20.01 – 35.00
D	Progression less favorable, longer cycle length and high flow/capacity ratio. The proportion of vehicles that pass through without stopping diminishes. Individual cycle failures are obvious.	35.01 – 55.00
E	Severe congestion with some long standing queues on critical approaches. Poor progression, long cycle lengths and high flow/capacity ratio. Individual cycle failures are frequent.	55.01 – 80.00
F	Very poor progression, long cycle lengths and many individual cycle failures. Arrival flow rates exceed capacity of intersection.	>80.01

Table 2. Unsignalized Intersection LOS Description.

LOS	Unsignalized Intersection Description	Average Control Delay (seconds)
A	Little or no delays.	0 - 10.00
B	Short traffic delays.	10.01 – 15.00
C	Average traffic delays.	15.01 – 25.00
D	Long traffic delays. Multiple vehicles in queue.	25.01 – 35.00
E	Very long delays. Demand approaching capacity of intersection.	35.01 – 50.00
F	Very constrained flow with extreme delays and intersection capacity exceeded.	>50.01

2.B MINIMUM LEVEL OF SERVICE (LOS)

Local agencies adopt minimum level of service standards for their facilities. Pursuant to the City's 2011 General Plan, the City requires that peak hour intersection operations be at LOS D or better to be considered acceptable. Therefore, City intersections operating at LOS E or F would be considered deficient.

2.C TRAFFIC SIGNAL WARRANT ANALYSIS

Per the City's TIA guide, traffic warrant analysis should be performed on all unsignalized study intersections to determine if the sign warrants are met for any study year scenario. The signal warrant analysis will be the Caltrans peak-hour warrants (Warrant 3) per the Caltrans Manual of Uniform Traffic Control Devices (CA MUTCD) Section 4C.04. Warrant analysis worksheets or warrant outputs from traffic analysis software are acceptable.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal may be warranted. Satisfying a signal warrant does not require that a traffic signal be installed at a particular location, rather other traffic factors and conditions should be evaluated to determine if signalization is justified. Additionally, signal warrants do not necessarily correlate with level of service; an intersection may satisfy a warrant and still be operating at or better than LOS D, or be operating at a deficient LOS (E or F) and not meet signal warrants.

2.C.1 Warrant 3, Peak Hour – Description

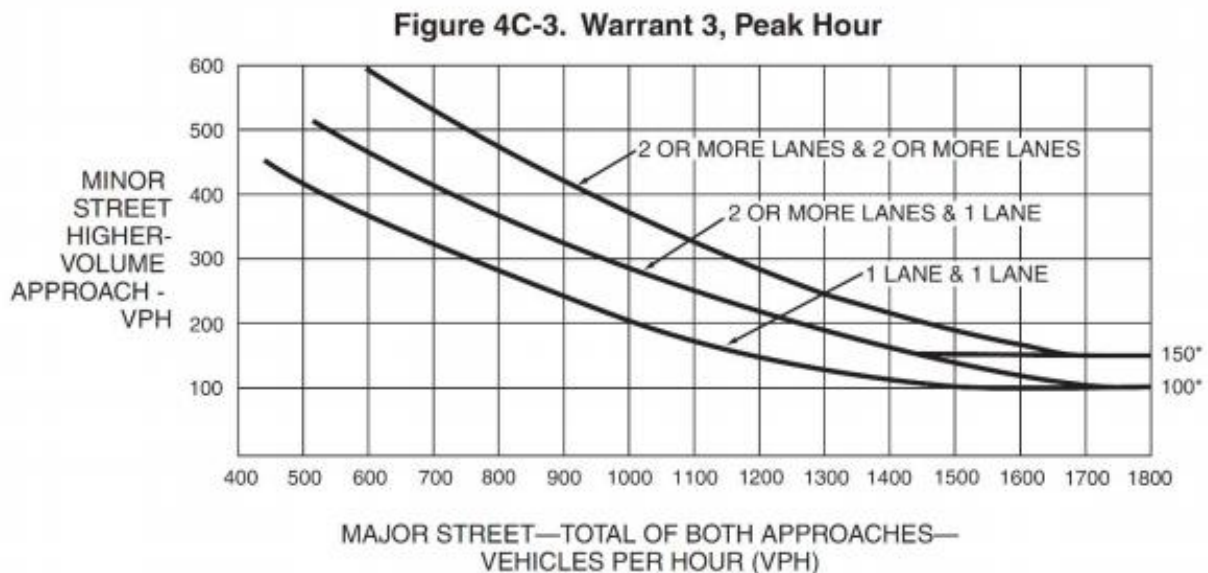
The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor street traffic suffers undue delay when entering or crossing the major street. Warrant 3 is usually applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy

vehicle facilities that attract or discharge large numbers of vehicles over a short time. In order for this warrant to be met, one of the following criteria must be met:

Criterion A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15 minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle hours for a one lane approach or 5 vehicle-hours for a two lane approach; **and**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **and**
3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four or more approaches.

Criterion B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) for 1 hour (any four consecutive 15 minute periods) of an average day falls above the applicable curve in Exhibit 3 (Caltrans MUTCD Figure 4C-3) for the existing combination of approach lanes.



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

Exhibit 3. Caltrans Figure 4C-3. Warrant 3, Peak Hour.

3. AREA CONDITIONS

As per the City's TIA guide, the following describes the area conditions, study roadways, and intersections.

3.A IDENTIFY STUDY AREA AND INTERSECTIONS

Exhibit 1 shows the study area and study intersections. The following five intersections will be included in the intersection LOS analysis:

- ➡ Mission Trail / Driveway (#1)
- ➡ Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2)
- ➡ Diamond Drive / Casino Drive (Auto Center Drive) (#3)
- ➡ Mission Trail / Malaga Road (#4)
- ➡ Diamond Drive / Malaga Road (#5)

The following section describes each intersection in detail

3.B EXISTING AND PROPOSED INTERSECTIONS

The **Mission Trail / Driveway (#1)** is an unsignalized "T" intersection. The intersection will operate as a stop controlled access. The northbound direction of Mission Trail has a two way left turn lane (TWLTL), one lane for through movements, and one lane for through and right turn movements. The southbound direction of Mission Trail has a two way left turn lane (TWLTL) and two through lanes. A stop sign will be located on the westbound direction (i.e., driveway), which is the full access driveway. Sidewalks are present along Mission Trail.

The **Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2)** is a signalized intersection. The northbound direction has an exclusive left turn lane, two through lanes, and one through and right turn lane. The southbound direction has two exclusive left turn lanes, one through lane, and one lane for through and right turn movements. The eastbound direction has an exclusive left turn lane, one through lane, and one through and right turn lane. The westbound direction has an exclusive left turn lane, two through lanes, and one exclusive right turn lane. Crosswalks are present on each approach. Sidewalks and curb ramps are present on each approach.

The **Diamond Drive / Casino Drive (Auto Center Drive) (#3)** is a signalized intersection. The northbound direction has an exclusive left turn lane, two through lanes, and one through and right turn lane. The southbound direction has two exclusive left turn lanes, one through lane, and one lane for through and right turn movements. The eastbound direction has an exclusive left turn lane, one through lane, and one through and right turn lane. The westbound direction has an exclusive left turn lane, one through lane, and one through and right turn lane. Crosswalks are present on each approach. Sidewalks and curb ramps are present on each approach.

The **Mission Trail / Malaga Road (#4)** is a signalized intersection. The northbound direction has an exclusive left turn lane, one through lane, and one lane for through and right turn movements. The southbound direction has an exclusive left turn lane, one through lane, and one lane for through and right turn movements. The eastbound direction has an exclusive left turn lane, one through lane, and one right turn lane. The westbound direction has an exclusive left turn lane, one through lane, and one through and right turn lane. Crosswalks are present on each approach except for the south approach. Sidewalks and curb ramps are present on each approach.

The **Diamond Drive / Malaga Road (#5)** is a signalized intersection. The northbound direction has an exclusive left turn lane, one through lane, and one lane for through and right turn movements. The southbound direction has an exclusive left turn lane, two through lanes, and an exclusive right turn lane. The eastbound direction has an exclusive left turn lane, one through lane, and one through and right turn lane. The westbound direction has an exclusive left turn lane, one through lane, and one through and right turn lane. Curb ramps are present on each approach. Crosswalks are present on each approach. Sidewalks are present on each approach except the eastside of Diamond Drive north of the intersection.

3.B.1 Existing Traffic Controls and Intersection Geometrics

Exhibit 4 shows the existing traffic controls and intersection geometrics. Please note that for Driveway #1 the southbound left turn lane is from a TWLTL.

3.C EXISTING ROADWAYS

This section describes the existing roadways in the study area.

Mission Trail is generally a five lane roadway near the project development with two through lanes in each direction and TWLTL. Roadway improvements generally include curb, gutter, and sidewalks along both sides. Bike lanes (i.e., Class II) are present on each side of roadway south of the project site. The speed limit is 45 miles per hour (mph). There is no on-street parking.

Auto Center Drive near Diamond Drive is generally a five lane roadway with two through lanes in the westbound direction and two through lanes and an exclusive left turn lane in the eastbound direction. Roadway improvements generally include curb, gutter, and sidewalks along both sides. There is no on-street parking.

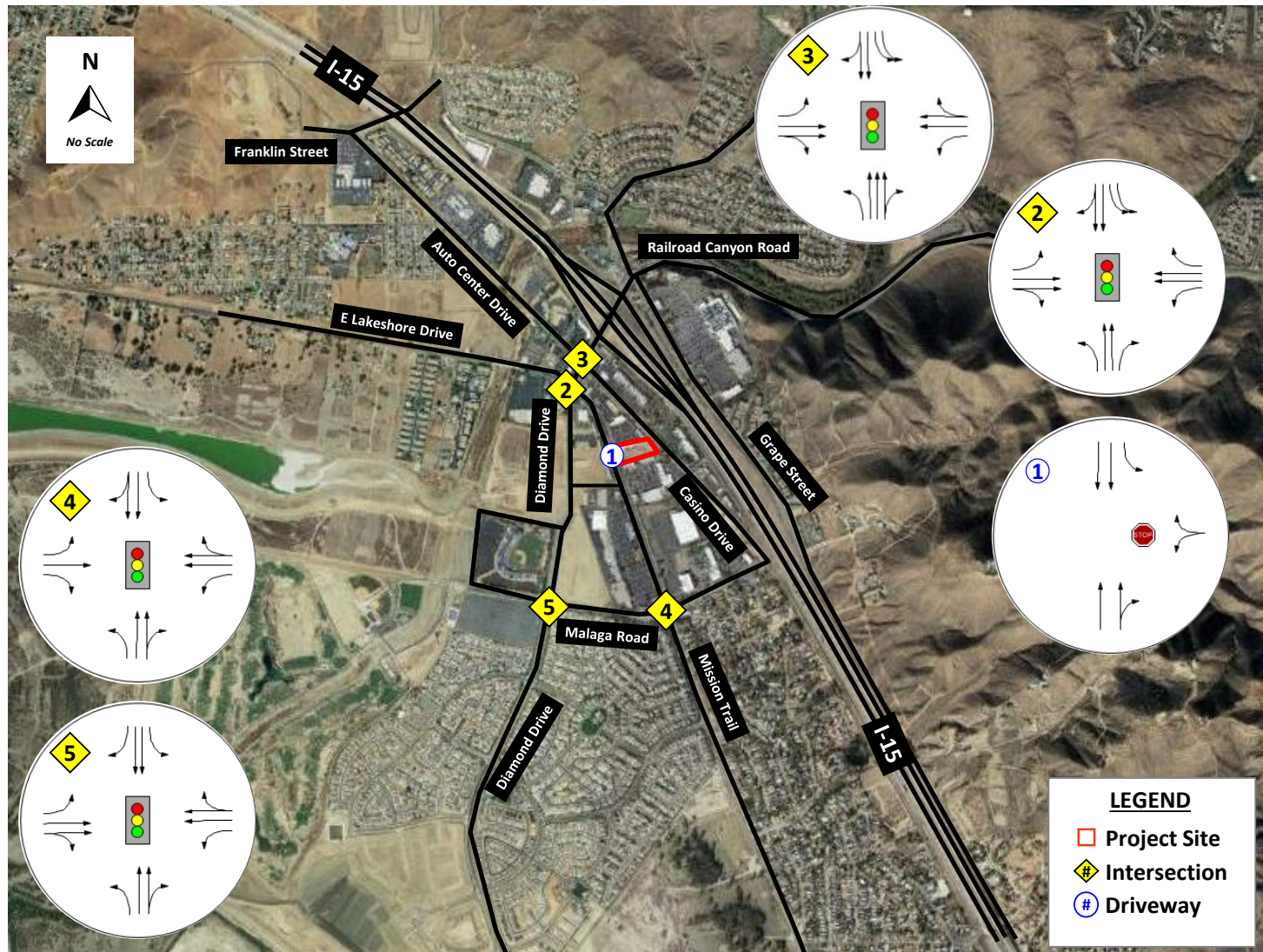


Exhibit 4. Existing Traffic Controls and Intersection Geometrics.

Casino Drive is generally a four lane roadway with two through lanes in the northbound direction and one through lane in the southbound direction. There is also a TWLTL. Roadway improvements generally include curb, gutter, and sidewalks along both sides. The speed limit is 45 mph. There is no on-street parking.

Diamond Drive from Mission Trail to Interstate 15 (I-15) ramps is an 8 lane roadway. There are four lanes in each direction. From Casino Drive toward I-15, the roadway is divided. Roadway improvements generally include curb, gutter, and sidewalks along both sides. The speed limit is 35 mph. There is no on-street parking.

Diamond Drive from Mission Trail to Malaga Road is generally a five lane roadway with two through lanes in each direction and TWLTL. Roadway improvements generally include curb and gutter. Sidewalk is only on developed parcels. The speed limit is 35 mph. There is no on-street parking.

Diamond Drive to the south of Malaga Road is generally a divided four lane roadway with two through lanes in each direction. Roadway improvements generally include curb, gutter, and sidewalks along both sides. Bike lanes (i.e., Class II) are present on each side of roadway. The speed limit is 35 mph. There is no on-street parking.

E. Lakeshore Drive near Diamond Drive is generally a five lane roadway with two through lanes in each direction and periodic left turn bays. Roadway improvements generally include curb, gutter, and sidewalks along both sides. The speed limit is 45 mph. There is no on-street parking.

Malaga Road from Diamond Drive and Mission Trail is generally a divided four lane roadway with two through lanes in each direction. Roadway improvements generally include curb, gutter, and sidewalks along both sides. A bike lane (i.e., Class II) is present on the south side of the roadway. The speed limit is 35 mph. There is no on-street parking.

3.D EXISTING TRAFFIC VOLUMES

Exhibits 5 and 6 present the Existing AM and PM Peak Hour traffic. Data is provided in Appendix B. Turning movement counts for intersections #2, #4, and #5 were collected on Thursday, February 18, 2021. For intersection #3, turning movement counts were collected on Thursday, February 25, 2021. All volumes represent typical weekday peak hour conditions and were collected in 15 minute intervals from 6:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. The observed peak hours for the study intersections are as follows:

- ➡ **Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2)**
 - AM Peak Hour is 8:00 AM to 9:00 AM
 - PM Peak Hour is 4:15 PM to 5:15 PM

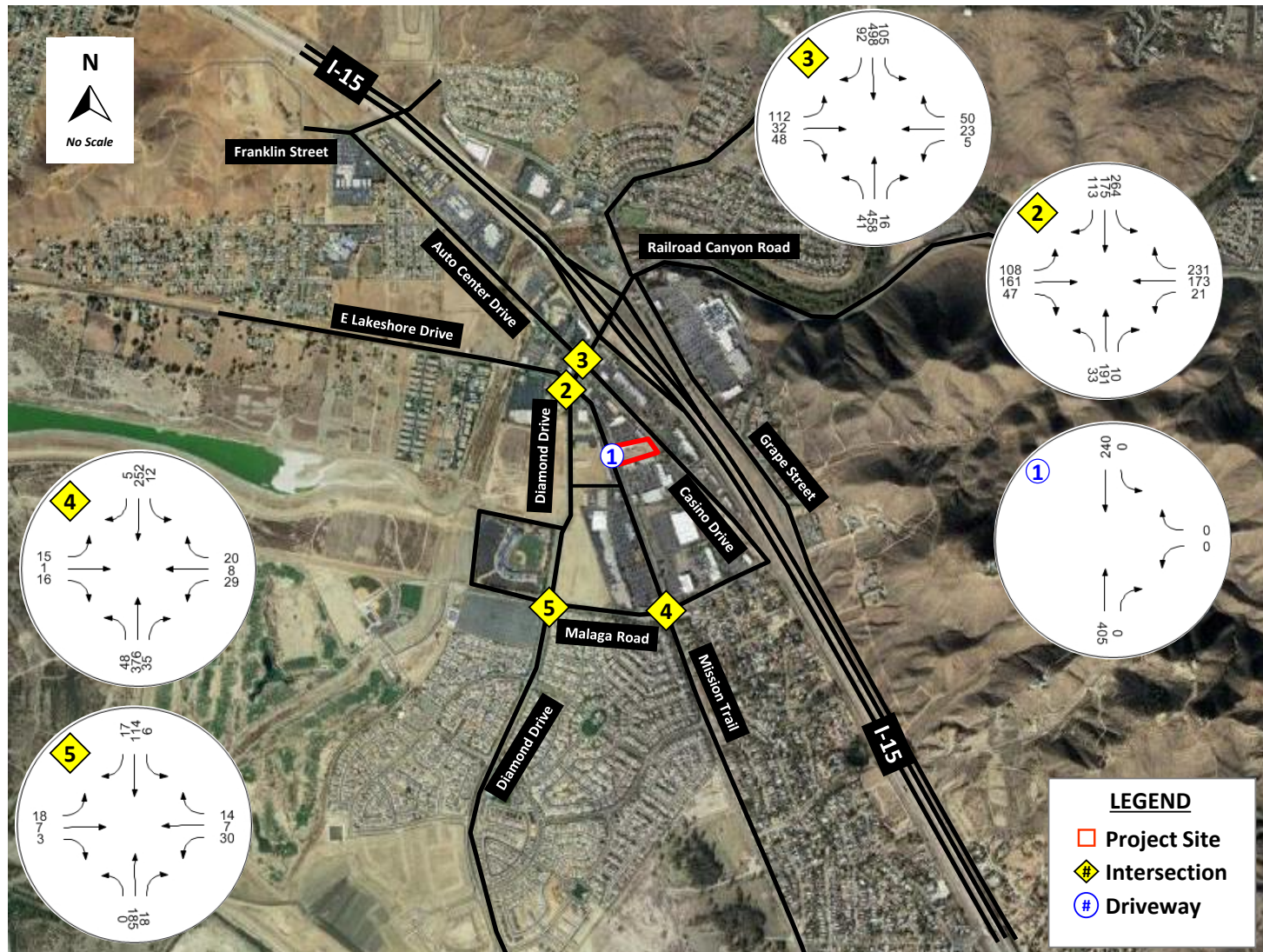


Exhibit 5. Existing AM Peak Hour Traffic Volumes.

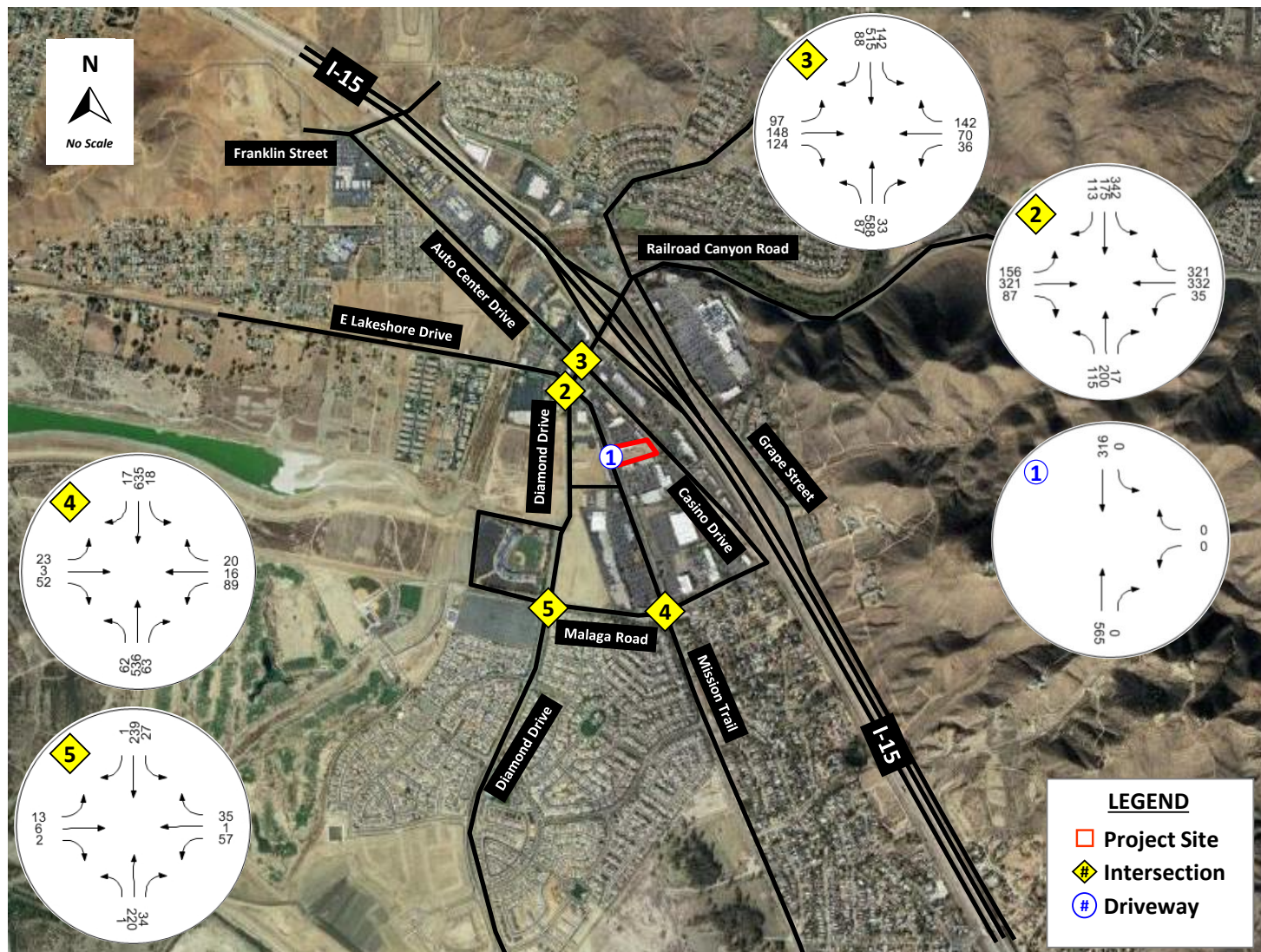


Exhibit 6. Existing PM Peak Hour Traffic Volumes.

- Diamond Drive / Casino Drive (Auto Center Drive) (#3)
 - AM Peak Hour is 8:00 AM to 9:00 AM
 - PM Peak Hour is 5:00 PM to 6:00 PM
- Mission Trail / Malaga Road (#4)
 - AM Peak Hour is 8:00 AM to 9:00 AM
 - PM Peak Hour is 4:00 PM to 5:00 PM
- Diamond Drive / Malaga Road (#5)
 - AM Peak Hour is 8:00 AM to 9:00 AM
 - PM Peak Hour is 4:00 PM to 5:00 PM

3.D.1 Discussion of Existing Traffic Volumes

Due to the coronavirus (COVID-19) pandemic, our turning movement counts were delayed until the California stay-at-home order was lifted. In addition, STE reviewed turning movement counts from a previous study (i.e., Lake Elsinore Diamond Sports Center Traffic Impact Analysis, Urban Crossroads, October 17, 2018), which were collected for the same intersections for this study. The 2018 data was projected to 2021 using a 2% annual growth factor. STE compared the data collected in 2021 to the projected 2018 data to see the potential COVID-19 impacts, if any. Based on our reviews and discussions with City personnel, there was no conclusive evidence of a COVID-19 impact on the 2021 data. In general, the 2021 data had higher values and would therefore provide a more conservative analysis.

3.E EXISTING CONDITION - DELAY AND LOS AT STUDY INTERSECTIONS

The Existing Condition for 2021 represents the baseline traffic at the time this report was prepared. The existing LOS was calculated for the study intersections using the latest procedures of the HCM, which has been discussed in Section 2.A. Table 3 presents the AM and PM Peak Hour LOS for the Existing Condition at the study intersections. All study intersections operate at LOS C or better for this condition. Appendix B provides the LOS analysis reports.

Table 3. Existing Condition LOS at Intersections.

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2)	Signalized	20.7	C	24.7	C
Diamond Drive / Casino Drive (Auto Center Drive) (#3)	Signalized	12.5	B	13.7	B
Mission Trail / Malaga Road (#4)	Signalized	14.2	B	17.7	B
Diamond Drive / Malaga Road (#5)	Signalized	11.0	B	13.2	B

3.F CITY OF LAKE ELSINORE GENERAL PLAN CIRCULATION ELEMENT

As per the City's TIA guide, STE has provided a copy of the City's General Plan Circulation Element that was adopted on December 12, 2011. Exhibit 7 shows the currently adopted General Plan Circulation Element Figure 3.4-4. Exhibit 8 shows the General Plan Recommended Circulation Roadway System Figure 3.4-14. In addition and as per the City's TIA guide, STE has provided a copy of the City's General Plan Recommended Roadway Cross-Sections Figure 3.4-15 in Exhibit 9.

With the respect to the General Plan figures, the study roadways are classified as the following:

- ➡ Mission Trail (E. Lakeshore Drive)
 - Currently, classified as Urban Arterial (6 – lanes / 120 ft Right-of-Way (ROW)).
 - The recommended classification is Urban Arterial (6 – lanes / 120 ft ROW).
- ➡ Diamond Drive (for majority of length in study area)
 - Currently, classified as Urban Arterial (6 – lanes / 120 ft ROW).
 - From Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2) to I-15, the recommended classification is Augmented Urban Arterial (8 – lanes).
 - From Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2) to the south, the recommended classification is Major Highway (4 – lanes / 100 ft ROW).
- ➡ Casino Drive (Auto Center Drive)
 - Currently, classified as Major Highway (4 – lanes / 100 ft ROW).
 - The recommended classification is Major Highway (4 – lanes / 100 ft ROW).
- ➡ Malaga Road
 - Currently, classified as Major Highway (4 – lanes / 100 ft ROW).
 - The recommended classification is Major Highway (4 – lanes / 100 ft ROW).

3.G TRANSIT SERVICE

The study area is currently served by the Riverside Transit Authority (RTA), a public transit agency serving the unincorporated Riverside County region. There are currently existing bus routes along E. Lakeshore Drive, Diamond Drive/Railroad Canyon Road, and Summerhill Drive/Grape Street via RTA Route 8 (see Exhibit 3-10). RTA Route 8 does have a bus stop near the proposed project site. Railroad Canyon Road and the I-15 Freeway are also served by RTA Routes 40 and Commuter Routes 205/206.

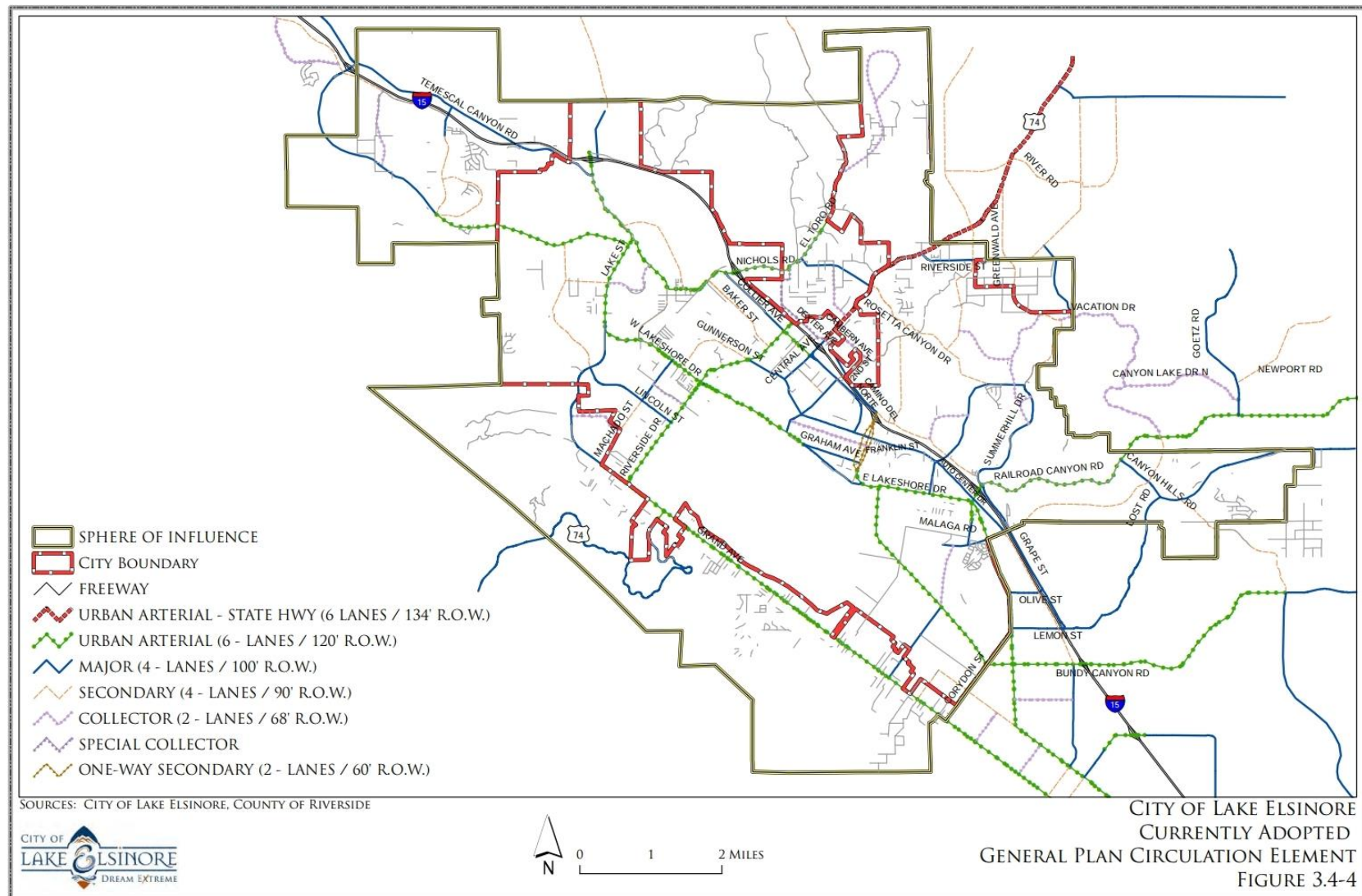


Exhibit 7. General Plan Circulation Element.

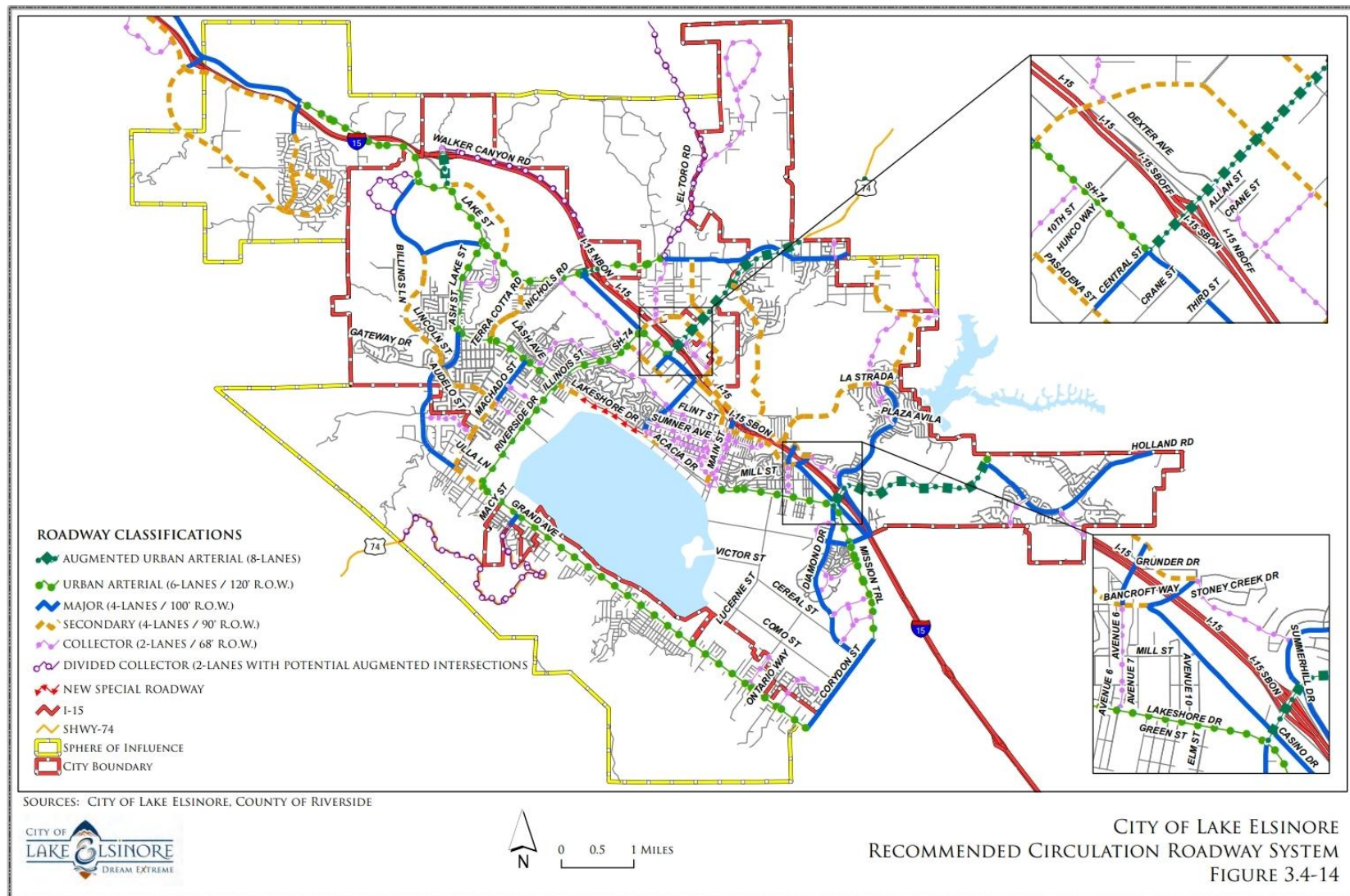


Exhibit 8. General Plan Recommended Circulation Roadway System.

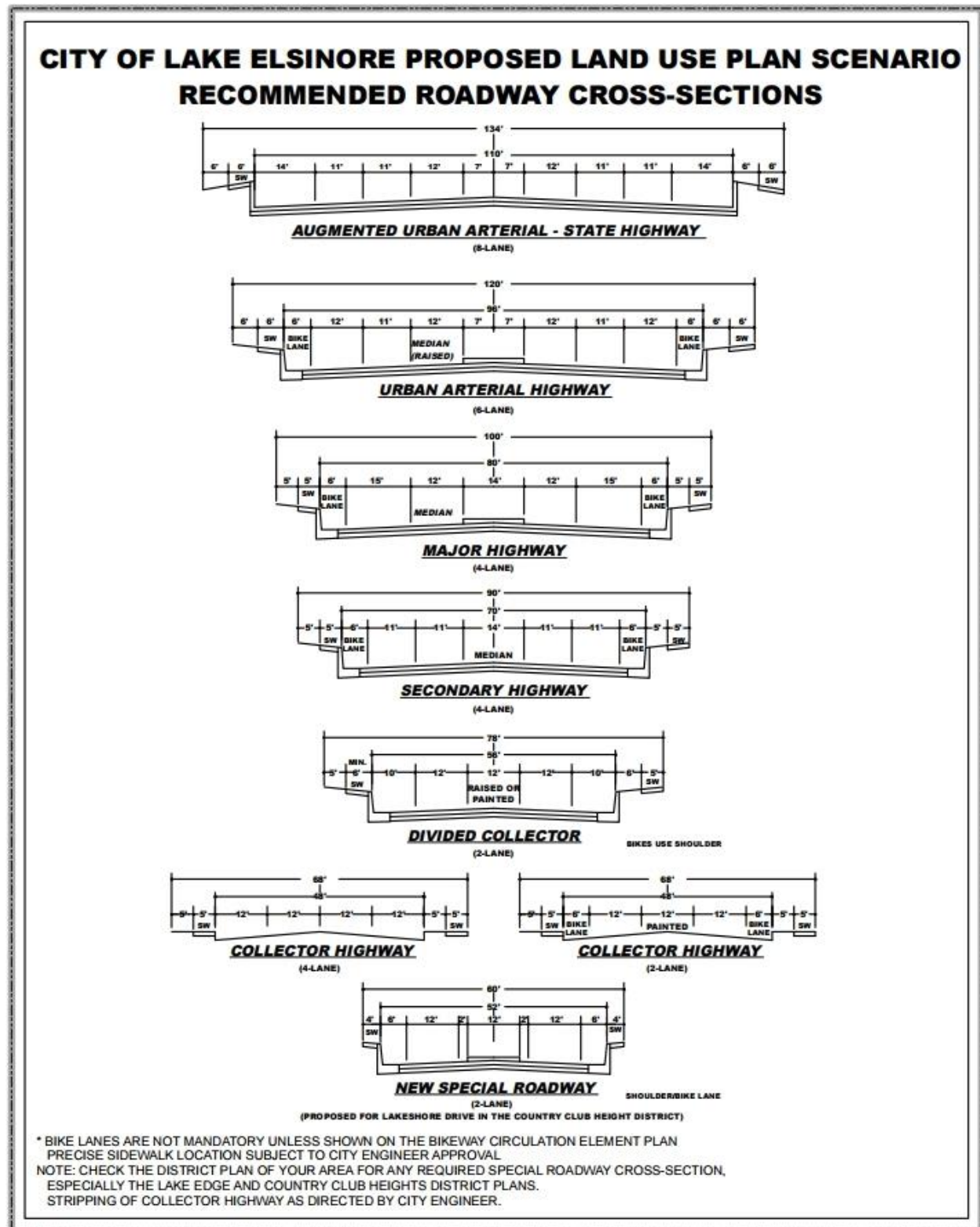


Exhibit 9. General Plan Recommended Roadway Cross Sections.



Exhibit 10. Existing Transit Routes and Bus Stops.

4. PROJECTED FUTURE TRAFFIC

This section describes the future traffic for the project and includes the ambient growth rate, project traffic, and cumulative project traffic in the study area.

4.A PROJECT TRAFFIC AND PROJECT PHASING

The project description has already been provided in Section 1.D.1. The project is a gas station with convenience store and automated car wash development. It has 18 fueling positions and an automated car wash with a GFA of 4,400 sf. The City requested that the gas station with convenience store be separated from the automated car wash for analysis purposes using various land uses in the ITE Trip Generation Manual.

4.A.1 Ambient Growth Rate

Construction of the project will occur in 2021 and the full project opening year will be in 2023. This is not a phased development. For the ambient growth rate, STE used a 2% annual growth factor.

4.A.2 Trip Generation

The Institute of Transportation Engineers (ITE) has produced an informational report called Trip Generation. This document is used as a tool for estimating the number of vehicle trips generated for a particular land use. STE was directed to use Land Use Code: 960 (Super Convenience Market / Gas Station) for the convenience market and gas station part of the development and Land Use Code: 948 (Automated Car Wash) for the automated car wash part of the development. Table 4 presents the trip generation average rates for the independent variables of GFA and Vehicle Fueling Positions (VFP). The trips for the AM and PM peak hours typically coincide with the peak hour of the adjacent street (i.e., 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM). Table 5 presents the approved number of trips for the day, AM Peak Hour, and the PM Peak Hour. From the analysis, this site would generate the 1,919 net trips per day, 207 net trips during the AM Peak Hour, and 210 net trips during the PM Peak Hour.

4.A.3 Trip Distribution & Assignment

Trip distribution is the procedure utilized in identifying the roadways used in traveling to and from the project site and the percentage of site related traffic that will use each roadway. The trip distribution was based on existing roadway network, traffic patterns observed by STE personnel, general review of the geographical distribution of developments within the project study area, and discussions with City personnel. The trip distribution was provided in our original scoping agreement and approved by the City. Exhibit 11 presents the trip distribution and net trip assignment for the proposed condition. Once the trip distribution was determined, the trips were assigned to the roadway network. This trip assignment reflects how the trips reach their ultimate destinations.

Table 4. Trip Generation Rates for Project.

				Daily			AM Peak Hour			PM Peak Hour		
Independent Variable		Land Use		Trips / Independent Variable	% Enter	% Exit	Trips / Independent Variable	% Enter	% Exit	Trips / Independent Variable	% Enter	% Exit
18	VFP	Super Convenience Market/Gas Station	960	230.52	50%	50%	28.08	50%	50%	22.96	50%	50%
4,400	GFA	Automated Car Wash	948	900 ^[a]	50% ^[a]	50% ^[a]	36 ^[a]	50% ^[a]	50% ^[a]	14.20	50%	50%

^[a] Values taken from SANDAG Not So Brief Guide of Vehicular Traffic Generation Rates for Daily and AM Peak Hour.

Table 5. Trip Generation Summary for Project.

				Daily			AM Peak Hour			PM Peak Hour		
Independent Variable		Land Use		Trips	Enter	Exit	Trips	Enter	Exit	Trips	Enter	Exit
18	VFP	Super Convenience Market/Gas Station	960	4,150	2,075	2,075	505	253	252	414	207	207
4,400	GFA	Automated Car Wash	948	900 ^[a]	450 ^[a]	450 ^[a]	36 ^[a]	18 ^[a]	18 ^[a]	62	31	31
Total Trips Generated				5,050	2,525	2,525	541	271	270	476	238	238
Pass-By Trips		Pass-By Percentage (62% AM/Daily, 56% PM) ^[b]		-3,131	-1,566	-1,565	-335	-168	-167	-267	-134	-133
Net Trips				1,919	959	960	206	103	103	209	104	105

^[a] Values taken from SANDAG Not So Brief Guide of Vehicular Traffic Generation Rates for Daily and AM Peak Hour.

^[b] There are no pass-by percentages for Land Use 960 in the ITE Trip Generation Handbook, 3rd Edition, 2017. The closest land use would be Land Use 945 Gasoline/Service Station with Convenience Market. Pass-by rate was applied to total trips generated.

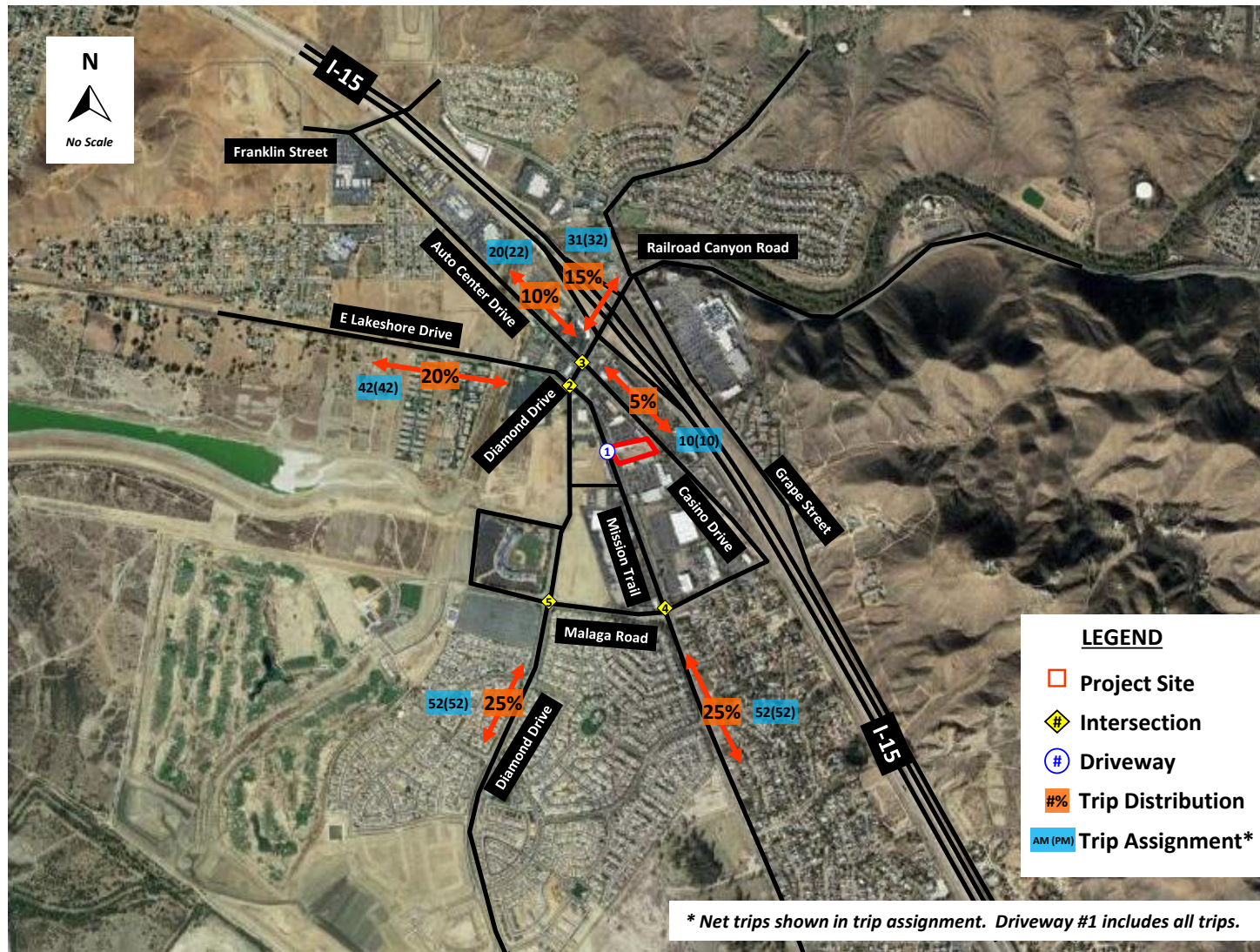


Exhibit 11. Trip Distribution & Assignment.

4.A.4 Pass-By Trip Adjustment

Pass-by trip adjustment is allowed for certain land uses such as gas stations with convenience markets. A pass-by trip is an intermediate stop on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator. Pass-by trips are not new to the overall roadway network. Table 5 shows the approved pass-by percentages used for Daily, AM Peak Hour, and PM Peak Hour. The latest ITE Trip Generation Handbook does not have a pass-by percentage for Land Use Code: 960 Super Convenience Market / Gas Station. STE used Land Use Code: 945 Gasoline / Service Station with Convenience Market. The pass-by percentage for Daily and AM Peak Hour is 62% and for PM Peak Hour is 56%.

4.A.5 Project Peak Hour Turning Movement

Exhibits 12 and 13 show the net project trips for the AM and PM Peak Hour turning movement traffic, respectively. Per City's request, Exhibit 14 shows the pass-by trips only at Mission Trail / Driveway (#1) for AM and PM Peak Hours.

4.B CUMULATIVE PROJECT TRAFFIC

STE worked with City personnel to identify the location of previously approved and proposed development projects in the City. Table 6 shows the list of cumulative projects. Exhibit 15 shows the location of the cumulative projects with respect to the proposed project along Mission Trail. Exhibits 16 and 17 show the cumulative project turning movements for the study intersection for the AM and PM Peak Hours, respectively. The primary document for cumulative trip information was the Lake Elsinore Diamond Sports Center Traffic Impact Analysis report by Urban Crossroads in October 2018 and discussions with City personnel.

Table 6. Cumulative Project List Provided by City.

Project Number	City / County	Project Name	Land Use	Quantity	Units ^[a]
LE01	Lake Elsinore	Ramsgate	Single Family Residential	1306.00	DU
			Condos/Townhomes	120.00	DU
LE02	Lake Elsinore	Spyglass Ranch	Single Family	523	DU
			Condominiums	171	DU
			Shopping Center	145.000	TSF
LE03	Lake Elsinore	South Shore I (Tract 31593)	Single Family	521	DU
		South Shore II (Tract 36567)	Single Family	400	DU
LE04	Lake Elsinore	La Strada (Tract 32077)	Single Family	134	DU
LE05	Lake Elsinore	Marina Village Condos (Tract: 33820)	Condominiums	94	DU

Project Number	City / County	Project Name	Land Use	Quantity	Units ^[a]
LE06	Lake Elsinore	Diamond Specific Plan	Condominiums	600	DU
			Hotel	150	RM
			General Office	425.000	TSF
			Shopping Center	472.000	TSF
LE07	Lake Elsinore	The Colony	Apartments	211	DU
		TAG Property	Single Family	2407	DU
			Condominiums	324	DU
		John Laing Homes (Phase 2)	Single Family	506	DU
			Condominiums	1141	DU
			Apartments	308	DU
			Shopping Center	117.000	TSF
LE08	Lake Elsinore	Lake Elsinore Walmart	Retail	151.397	TSF
			Specialty Retail	5.300	TSF
			Fast-Food without Drive-Thru	5.300	TSF
			Fast-Food without Drive-Thru	6.800	TSF
LE09	Lake Elsinore	Summerly	Single Family	142	DU
LE10	Lake Elsinore	Beazer	Single Family	72	DU
		KB Homes	Single Family	106	DU
		McMillin Homes	Single Family	143	DU
		Richmond American	Single Family	74	DU
LE11	Lake Elsinore	Lakeshore Town Center	Mixed-Use Commercial	237.400	TSF
LE12	Lake Elsinore	Canyon Hills Estates	Single Family	302	DU
LE13	Lake Elsinore	Canyon Hills	Single Family	2700	DU
			Apartments	1575	DU
			Single Family	1003	DU
LE14	Lake Elsinore	Alberhill Ridge	Single Family	1056	DU
			Apartments	345	DU
			Shopping Center	679.000	TSF
			General Office	679.000	TSF
LE15	Lake Elsinore	Alberhill Ranch	Single Family	1986	DU
LE16	Lake Elsinore	Terracina	Single Family	365	DU
LE17	Lake Elsinore	Village at Lakeshore (Tract 33267)	Condominiums	163	DU
LE18	Lake Elsinore	Alberhill Villages	Single Family Residential	8,244	DU
			Non-Residential	4,007.00	TSF
			University or similar use	6,000	STU
LE19	Lake Elsinore	Fairway Business Park	Heavy Industrial	216.6	TSF
LE20	Lake Elsinore	LE Sports Complex	Recreational	525	TSF
LE21	Lake Elsinore	Artisan Alley	Commercial	95.1	TSF
LE22	Lake Elsinore	Running Deer (TR)	Single Family Residential	101	DU

Project Number	City / County	Project Name	Land Use	Quantity	Units ^[a]
		31957)			
LE23	Lake Elsinore	Lakeview Manor	Condominiums	104	DU
LE24	Lake Elsinore	Tige Watersports	Boat dealership	34.5	TSF
LE25	Lake Elsinore	Kassab Travel Center	Gas Station, restaurants	17.2	TSF
LE26	Lake Elsinore	North Peak Plaza	Hotel	97	RM
			Commercial	37.5	TSF
LE27	Lake Elsinore	Nichols Ranch	Single Family Residential	141	DU
			Hotel	130	RM
			Commercial	29.5	TSF
LE28	Lake Elsinore	Lake Street Storage	Indoor RV & Boat Storage	90	TSF
			Gas station, mini-mart	3	TSF
LE29	Lake Elsinore	Bamiyan Marketplace	Multi-Family Residential	80	DU
			C-store, restaurant	6.3	TSF
			Restaurants with drive-thru	7.2	TSF
			Gas station, car wash	6	TSF
			Commercial	19.5	TSF
LE30	Lake Elsinore	Pennington Industrial Park	Industrial	90	TSF
LE31	Lake Elsinore	The Lakeview Plaza	Commercial retail center	43	TSF
LE32	Lake Elsinore	Corydon Gateway	Fast-Food with Drive-Thru	2.3	TSF
			C-store with gas station	4	TSF
			Carwash	4.3	TSF
			Tire store	5.2	TSF
			flex-condos (retail/offices)	22.08	TSF
LE34	Lake Elsinore	Golcheh Group	Fast-Food with Drive-Thru	4.5	TSF
			C-store with gas station	4.6	TSF
			Carwash	3.9	TSF
			Self-storage	38	TSF
LE35	Lake Elsinore	Lake and Mountain Commercial Center	Fast-Food with Drive-Thru	5.8	TSF
			C-store with gas station	4.9	TSF
			Carwash	3.1	TSF
			retail buildings	3.2	TSF
LE36	Lake Elsinore	Xebec Building Company	Industrial	51	TSF
LE37	Lake Elsinore	Pacific Coral	Single Family Residential	205	DU
LE38	Lake Elsinore	Sunny Express carwash	Carwash	5.4	TSF
LE39	Lake Elsinore	Tommy's Express carwash	Carwash	4.3	TSF

^[a] TSF= Thousand Square Feet; DU= Dwelling Unit; AC = Acres; STU = Student; RM= Rooms.

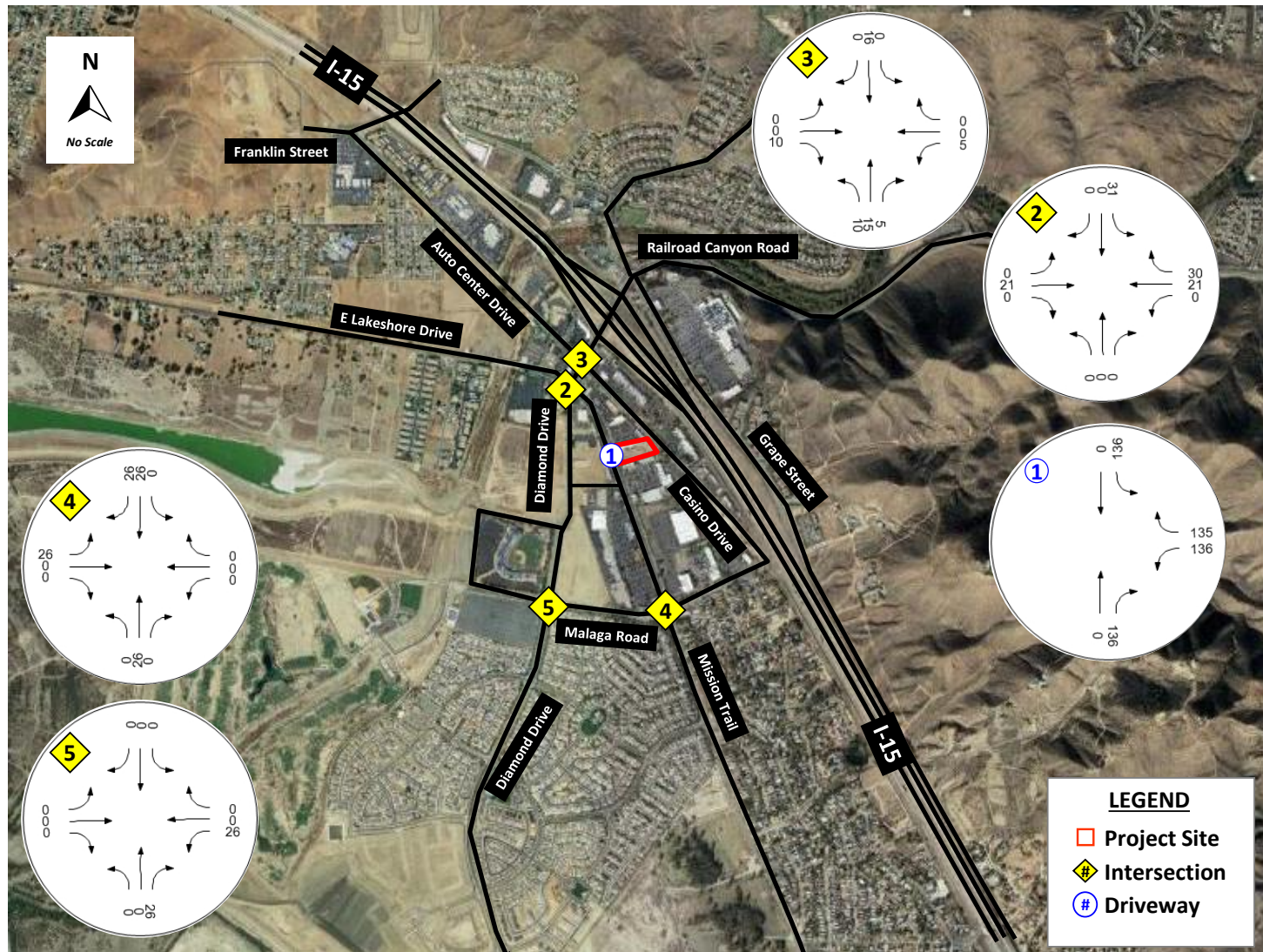


Exhibit 12. Project AM Peak Hour Turning Movement.

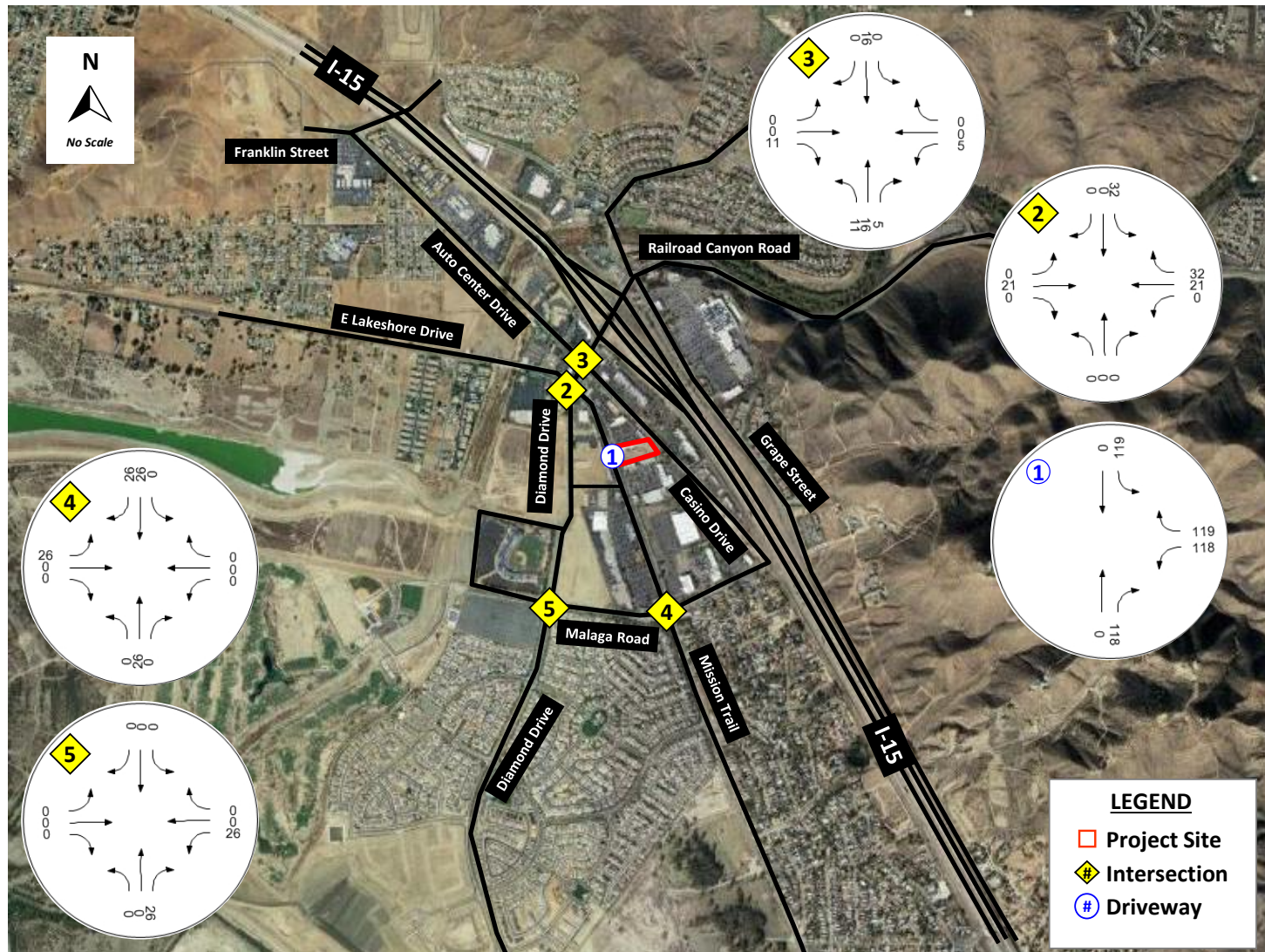


Exhibit 13. Project PM Peak Hour Turning Movement.

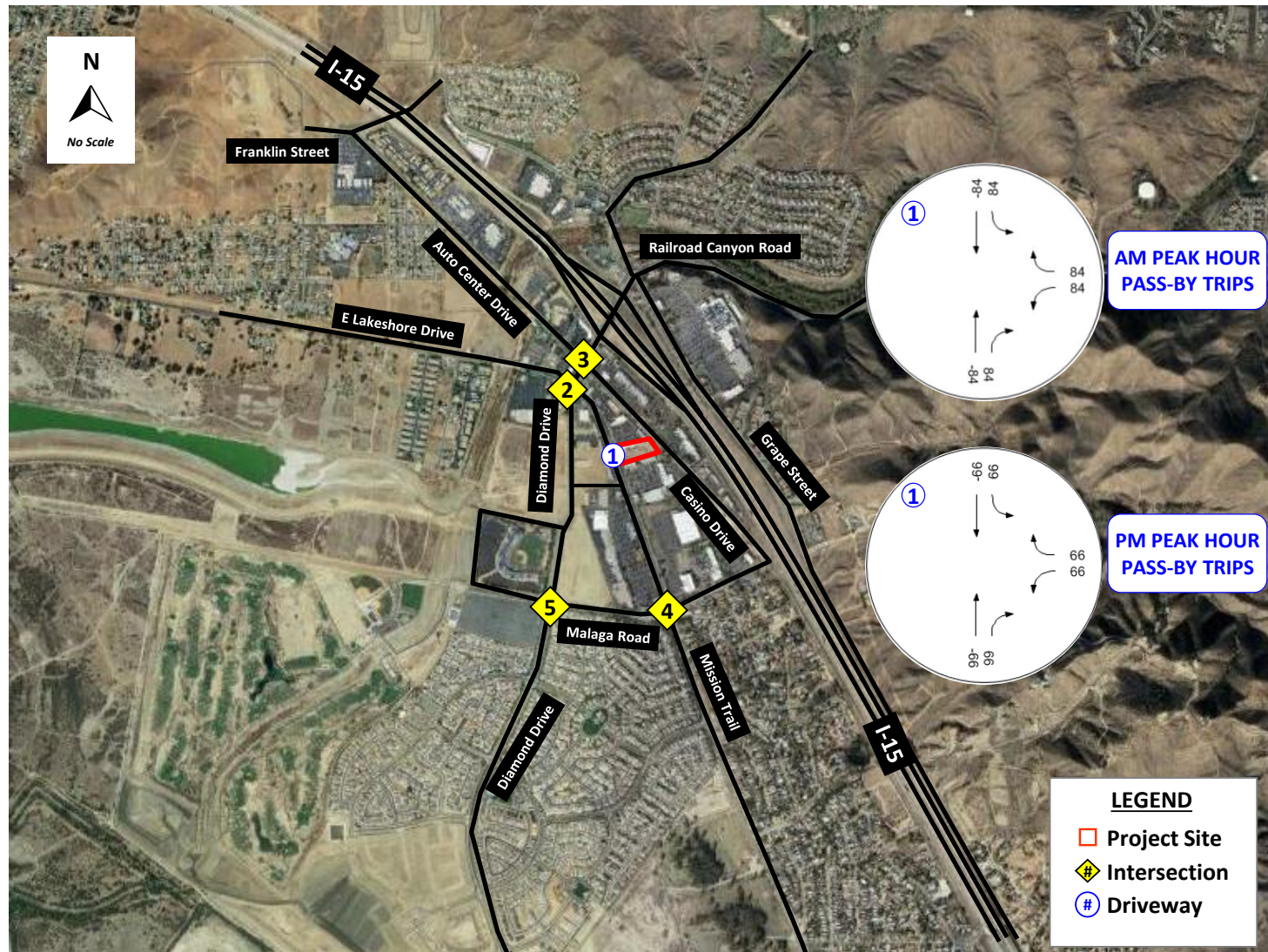


Exhibit 14. Pass-By Trips at Intersection # 1 for AM and PM Peak Hours.

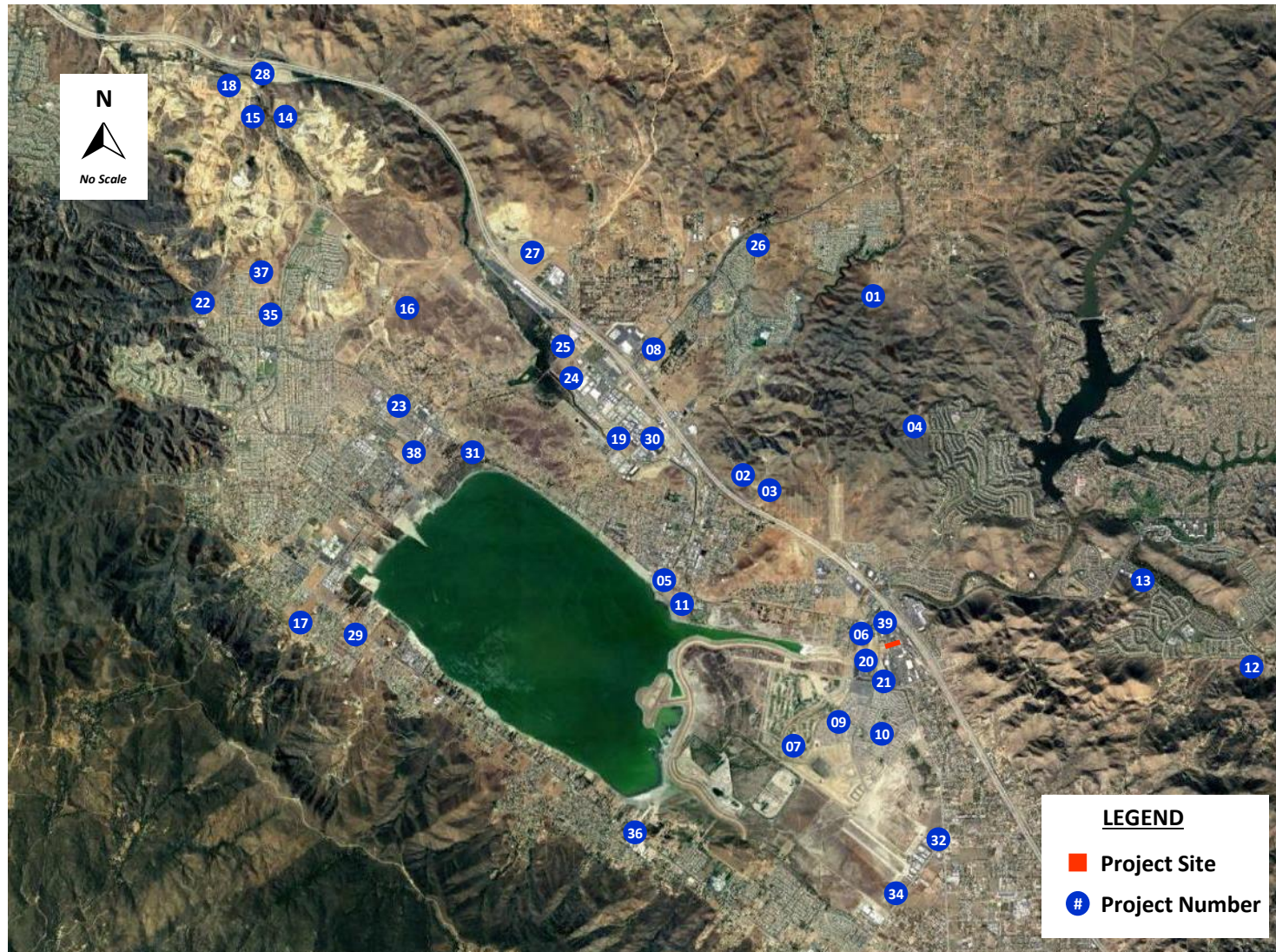


Exhibit 15. Cumulative Project Locations.

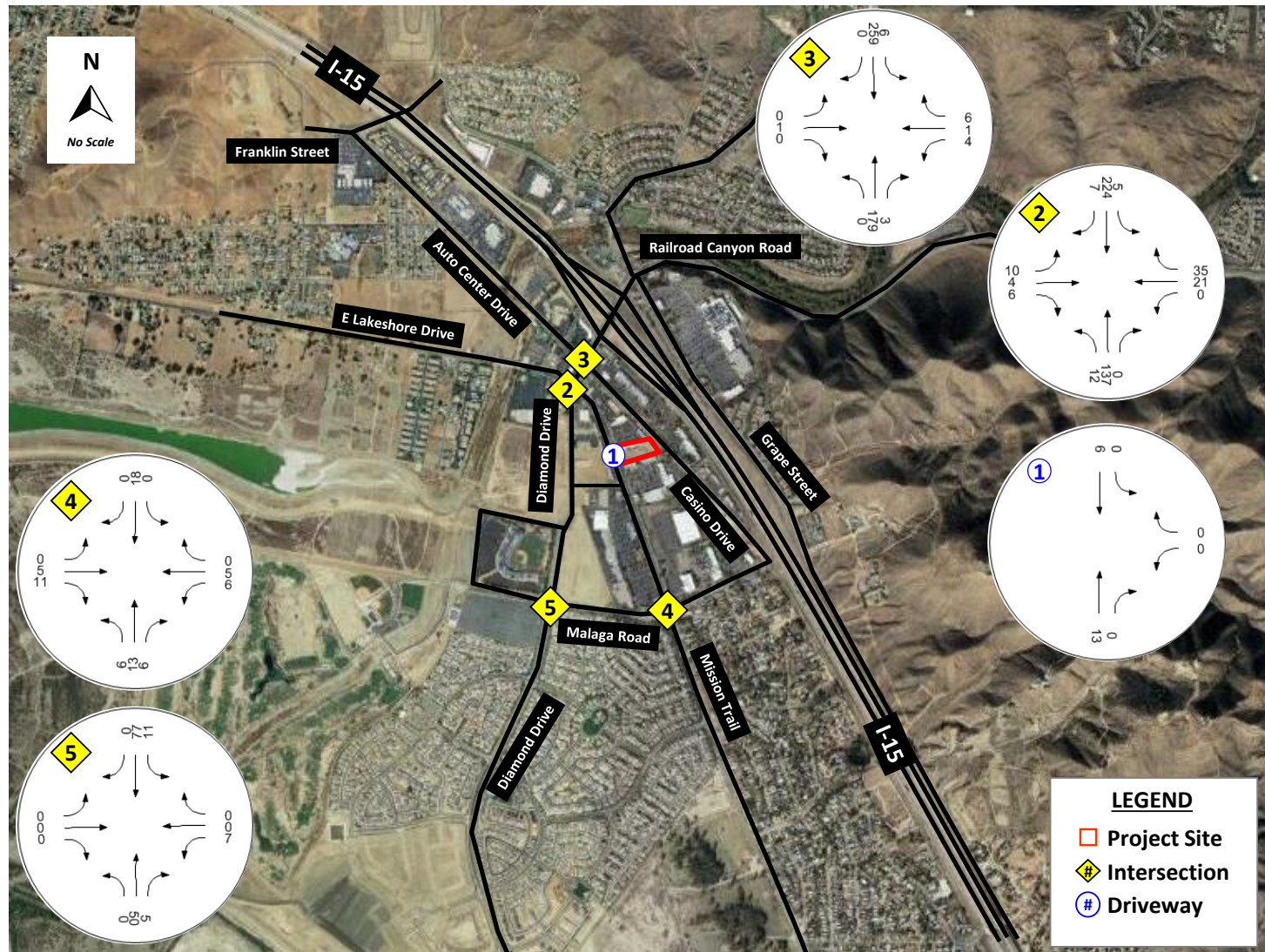


Exhibit 16. Cumulative Project AM Peak Hour Turning Movement.

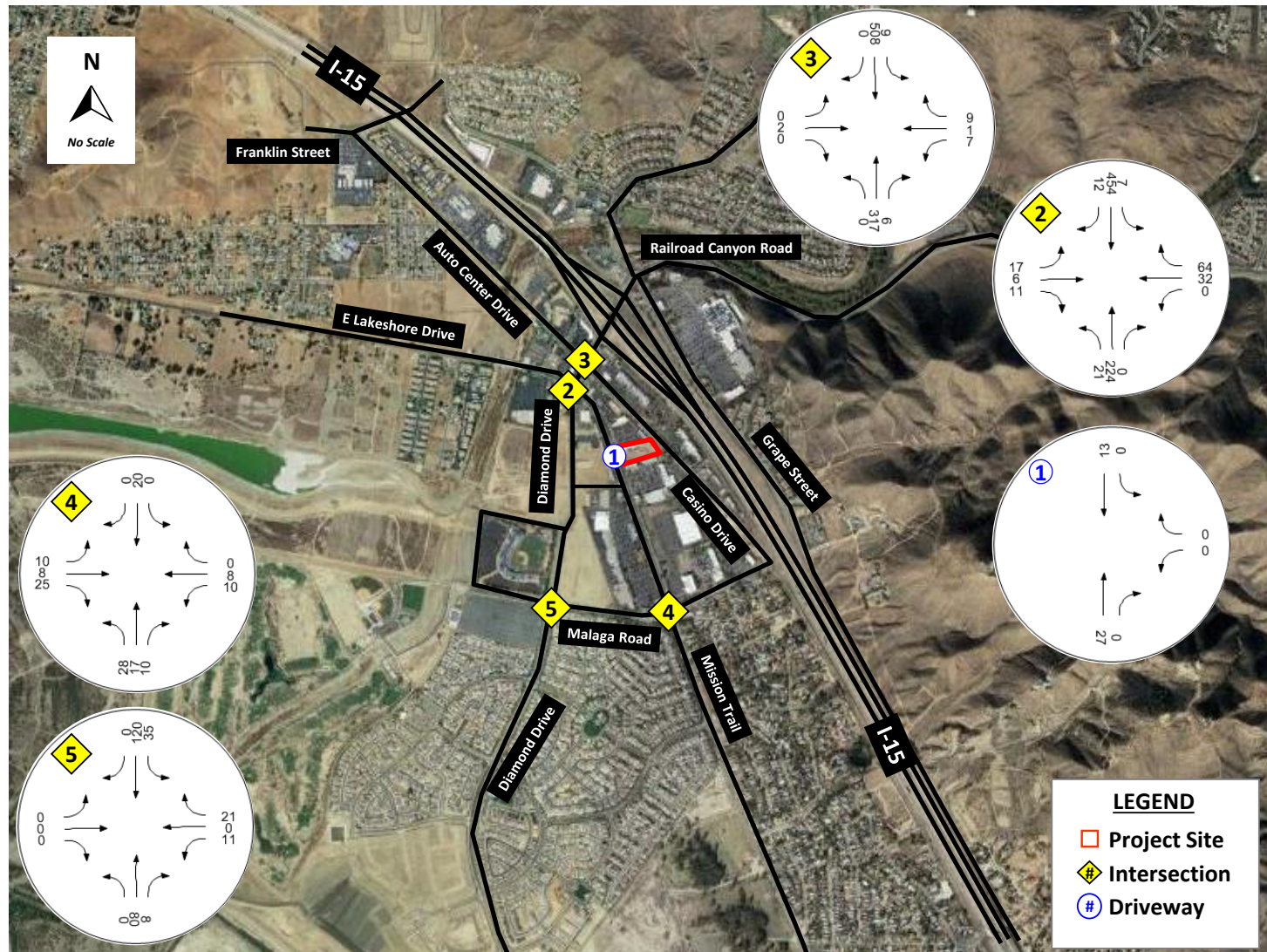


Exhibit 17. Cumulative Project PM Peak Hour Turning Movement.

5. EXISTING PLUS AMBIENT PLUS PROJECT CONDITION (EAP)

The EAP Condition analysis is intended to identify the project related impacts on planned near-term circulation system by comparing the EAP Condition to the Existing Condition. The EAP analysis is intended for the opening year impacts associated with the development of the proposed project based on the expected background growth. As was mentioned previously, the ambient growth rate of 2% per year was used (i.e., EAP for 2023 = 2021 data x $(1 + 2\%)^2$ years plus Project Trips). Exhibits 18 and 19 show the EAP AM and PM Peak Hour turning movements at the study intersections.

5.A EAP CONDITION - DELAY AND LOS AT STUDY INTERSECTIONS

The EAP Condition for 2023 represents the baseline traffic projected to the year 2023 along with the project trips. The EAP LOS was calculated for the study intersections using the latest procedures of the HCM, which has been discussed in Section 2. Table 7 presents the AM and PM Peak Hour LOS for the EAP Condition at the study intersections. All study intersections including the driveway operate at LOS D or better for this condition. Appendix D provides the LOS analysis reports.

As per the City of Lake Elsinore Traffic Impact Analysis Preparation Guide, this condition is the basis for determining project-specific impacts and conditions for approval. ***Based on this analysis, the proposed development does not significantly impact any of the study intersections.***

Table 7. EAP LOS at Intersections.

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Mission Trail / Driveway (#1)	Two-Way Stop (TWSC)	21.2	C	24.7	C
Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2)	Signalized	22.4	C	28.3	C
Diamond Drive / Casino Drive (Auto Center Drive) (#3)	Signalized	12.8	B	14.4	B
Mission Trail / Malaga Road (#4)	Signalized	15.4	B	18.5	B
Diamond Drive / Malaga Road (#5)	Signalized	12.2	B	14.1	B

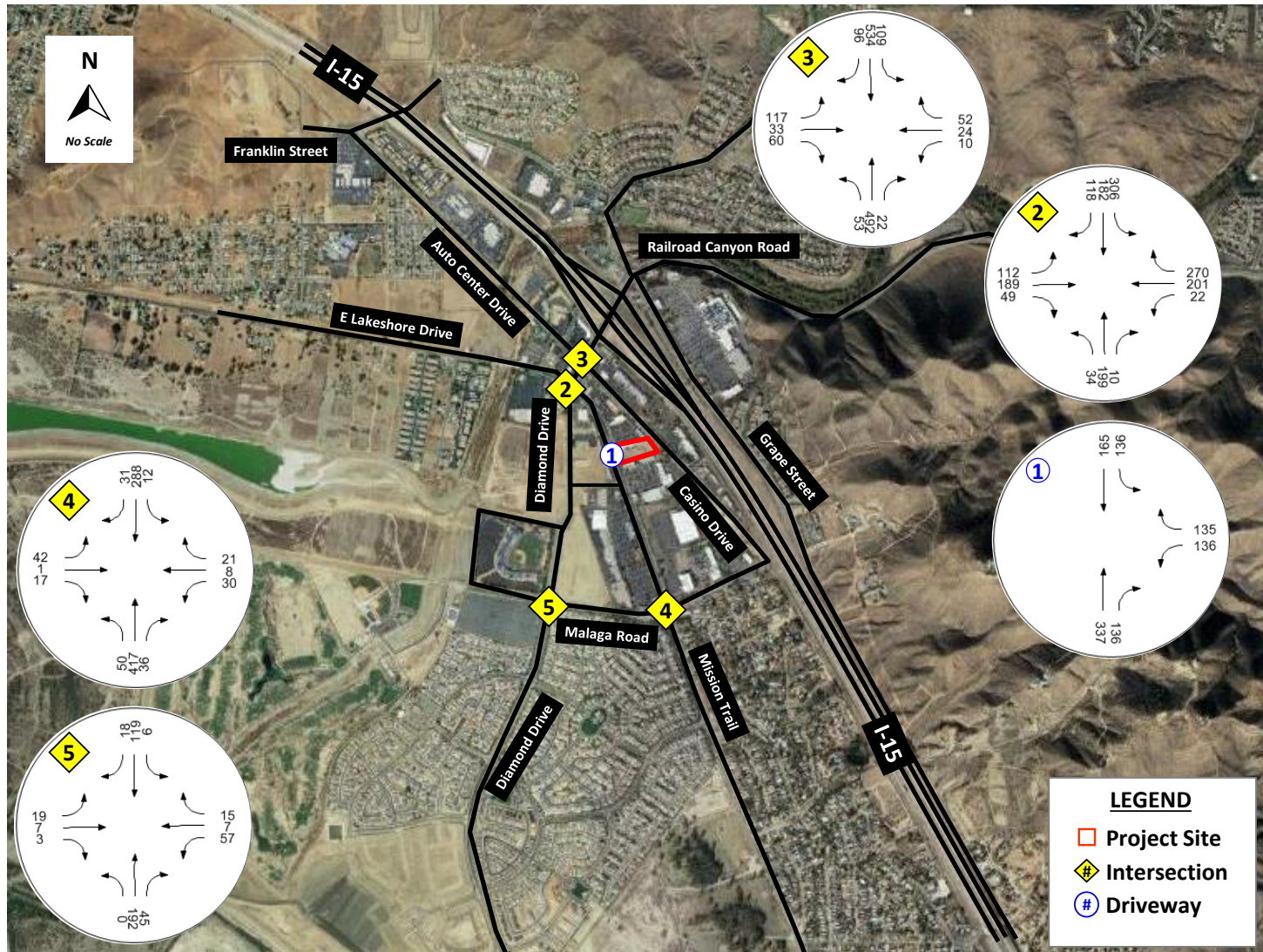


Exhibit 18. EAP Condition AM Peak Hour Turning Movement.

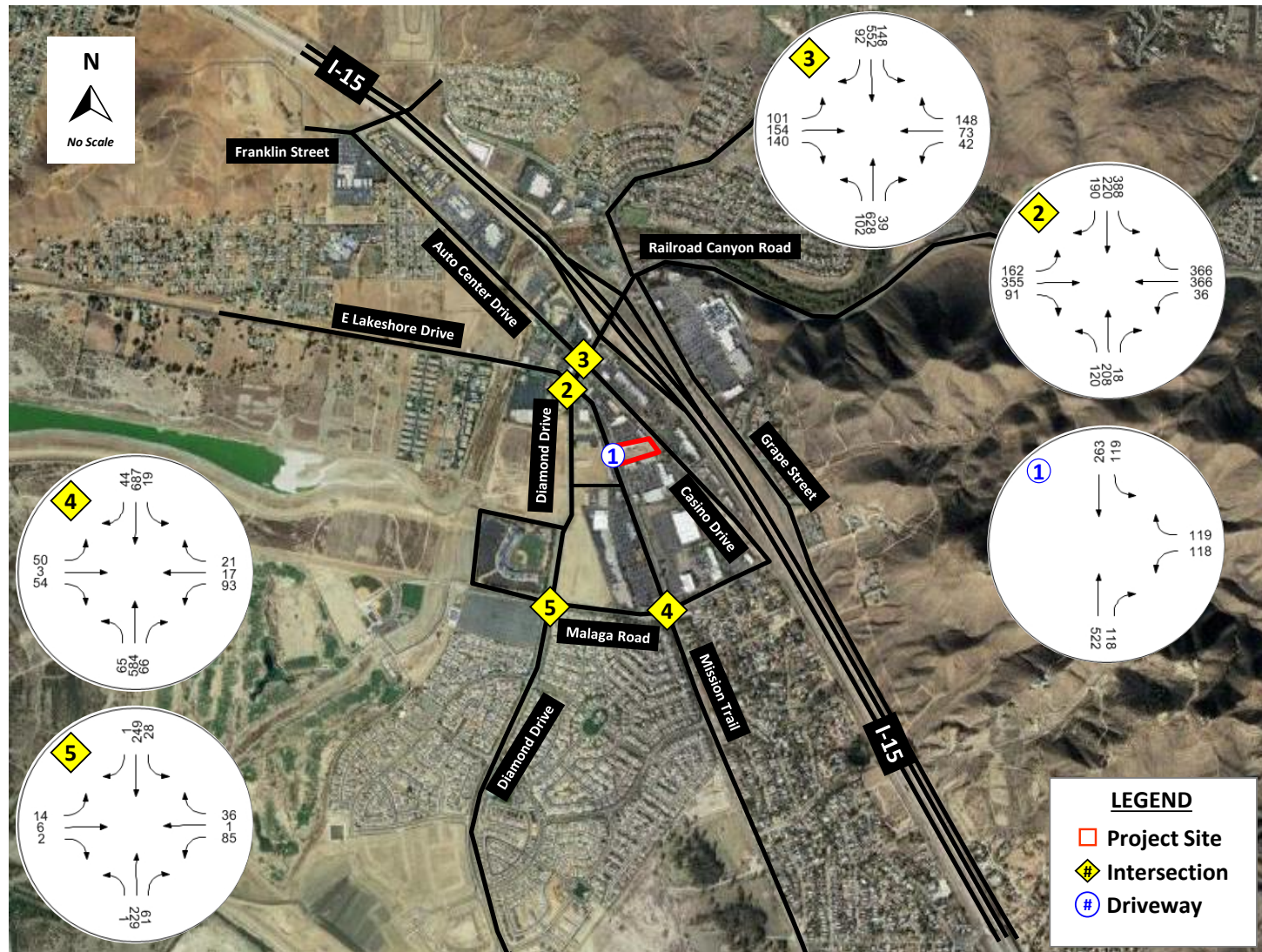


Exhibit 19. EAP Condition PM Peak Hour Turning Movement.

5.B EAP CONDITION - SIGNAL WARRANT ANALYSIS

Traffic signal warrant analyses were prepared based on EAP peak hour intersection volumes at the unsignalized project site access, Mission Trail/Driveway (#1). Traffic signal warrant reports for each condition are provided in Appendix E. No stop controlled intersections met the Signal Warrant 3 criteria. Table 8 summarizes the results of the analysis.

Table 8. Traffic Signal Warrant 3 Analyses for Various Conditions.

Intersection	Existing Condition		EAP Condition		EAPC Condition	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Mission Trail / Driveway (#1)	N/A	N/A	N	N	N	N

Y – Warrant is met, N – Warrant is not met, N/A – Not applicable

6. EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE CONDITION (EAPC)

The EAPC Condition analysis is intended to identify possible improvements to the network based on the ambient growth of the circulation system, proposed project trips, and traffic generated by other approved projects. This scenario is EAP Condition plus the Cumulative project traffic. Exhibits 20 and 21 show the EAPC AM and PM Peak Hour turning movements at the study intersections.

6.A EAPC CONDITION - DELAY AND LOS AT STUDY INTERSECTIONS

The EAPC Condition for 2023 represents the baseline traffic projected to the year 2023 with the project trips and cumulative trips. The EAPC LOS was calculated for the study intersections using the latest procedures of the HCM, which has been discussed in Section 2. Table 9 presents the AM and PM Peak Hour LOS for the EAPC Condition at the study intersections. All study intersections including the driveway operate at LOS D or better for this condition except for Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2), which is LOS E during the PM Peak Hour. Appendix F provides the LOS analysis reports.

Table 9. EAPC LOS at Intersections.

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Mission Trail / Driveway (#1)	TWSC	21.7	C	26.1	D
Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2)	Signalized	24.3	C	67.9	E
Diamond Drive / Casino Drive (Auto Center Drive) (#3)	Signalized	13.0	B	17.5	B
Mission Trail / Malaga Road (#4)	Signalized	16.3	B	19.8	B
Diamond Drive / Malaga Road (#5)	Signalized	12.3	B	15.4	B

6.B EAPC CONDITION - SIGNAL WARRANT ANALYSIS

Traffic signal warrant analyses were prepared based on EAPC peak hour intersection volumes at the unsignalized project site access, Mission Trail/Driveway (#1). Traffic signal warrant reports for each condition are provided in Appendix E. No stop controlled intersections met Signal Warrant 3 criteria. Summary was previously shown in Table 8.

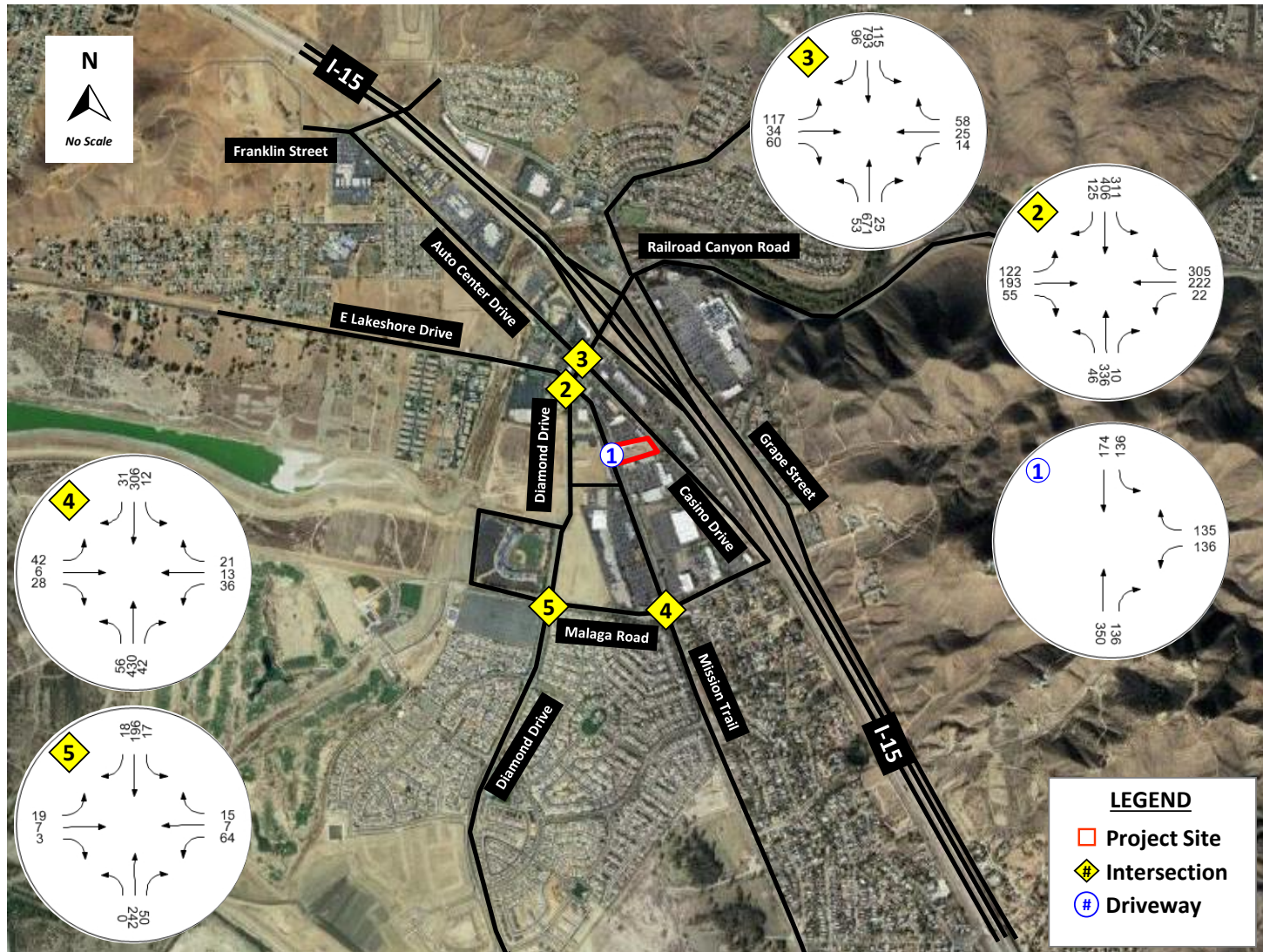


Exhibit 20. EAPC Condition AM Peak Hour Turning Movement.

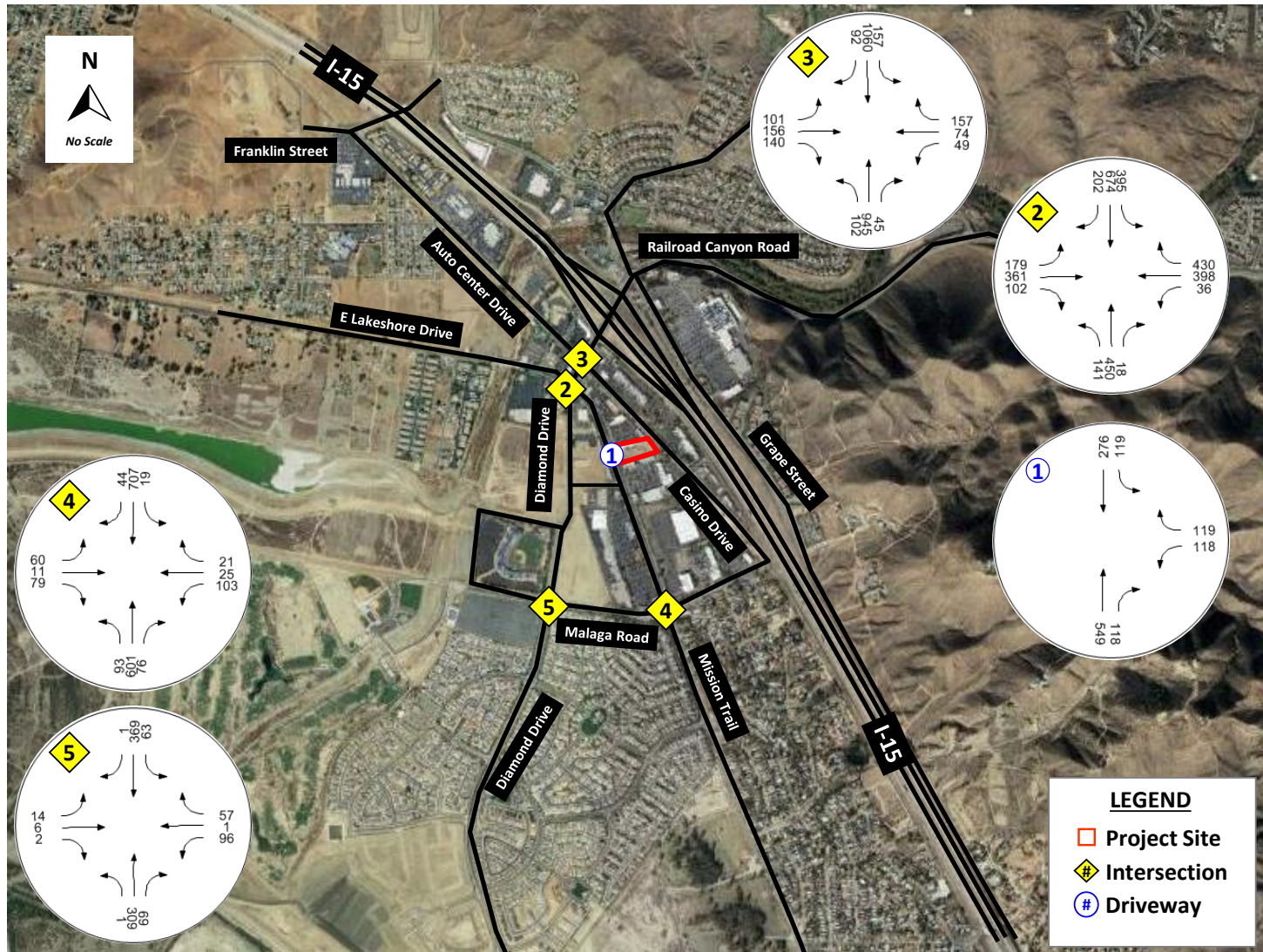


Exhibit 21. EAPC Condition PM Peak Hour Turning Movement.

6.C EAPC CONDITION – RECOMMENDED IMPROVEMENTS & ANALYSIS

As mentioned in Section 6.A, Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2) operates at LOS E during the PM Peak Hour. This is due to the cumulative projects that were added to the network. Based on other TIA reports (i.e., Lake Elsinore Diamond Sports Center Traffic Impact Analysis report) for the region, the only improvement needed to improve LOS is to modify the existing traffic signal operation by implementing an overlap phase on the westbound right turn lane. STE incorporated the signal operation improvement recommendation in its analysis. Table 10 presents the AM and PM Peak Hour LOS for the Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2) for the EAPC Condition with and without improvements. As shown in the table, the LOS is C with the overlap phase. Appendix G provides the LOS analysis reports.

Table 10. EAPC LOS With & Without Improvements.

Intersection	Control		AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2)	Signalized	Without Improvements	24.3	C	67.9	E
		With Improvements	21.4	C	37.0	D

7. FINDINGS AND RECOMMENDATIONS

This section of the report summarizes the project impacts for each condition that was analyzed.

7.A TRAFFIC IMPACTS AND LOS ANALYSIS

Based on discussions with City personnel, STE was to study the following conditions:

- Existing Condition
- Existing Plus Ambient Plus Project Condition (EAP)
- Existing Plus Ambient Plus Project Plus Cumulative Condition (EAPC)

Table 11 presents a summary of the LOS for the each condition analyzed. All study intersections operate at LOS D or better for AM and PM Peak Hours except for Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2) during the PM Peak Hour. The only improvement needed to improve LOS is to modify the existing traffic signal operation by implementing an overlap phase on the westbound right turn lane. The overlap phase will improve the LOS to D. This recommendation was also described in the Diamond Sports Center TIA report. In addition, no regional or special funding is necessary because this is not a physical change to intersection.

7.B TRAFFIC SIGNAL WARRANT ANALYSIS

STE evaluated the unsignalized project site access, Mission Trail/Driveway (#1), for a traffic signal. Traffic signal warrant analyses were prepared based on EAP and EAPC peak hour intersection volumes. Traffic signal warrant reports for each condition are provided in Appendix E. No stop controlled intersections met the CA MUTCD, Signal Warrant 3, Peak Hour criteria.

7.C CIRCULATION RECOMMENDATIONS

7.C.1 Queue Analysis

As part of this study, STE studied the queue for the study driveway. The back of queue is the number of vehicles per lane that are queued depending on arrival patterns of vehicles and vehicles that do not clear the intersection. STE analyzed the queuing based on a vehicle length of 25 ft. The purpose of investigating the queue is to ensure that there will be enough stacking distance for vehicles. Table 12 the queue for the critical movements at the driveway (i.e., southbound left (SBL) and westbound left (WBL) and for study conditions. The queue reported is the 95th percentile queue which is equal to the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily every observed, it is simply based on statistical calculations. Queue results are provided in LOS analysis reports in Appendices D and F. The analysis indicated that the worst 95th percentile queue of four vehicles (i.e., $4 \times 25 = 100$ ft) is for the westbound direction of the Mission Trail/Driveway (#1) intersection. Based on our site review, there is at least 150 ft of storage if needed.

Table 11. LOS Summary for Study Conditions.

Intersection	Control	Existing Condition				EAP Condition				EAPC Condition			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Mission Trail / Driveway (#1)	TWSC	[1]	[1]	[1]	[1]	21.2	C	24.7	C	21.7	C	26.1	D
Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2)	Signalized	20.7	C	24.7	C	22.4	C	28.3	C	24.3	C	67.9	E
										21.4 ^[2]	C ^[2]	37.0 ^[2]	D ^[2]
Diamond Drive / Casino Drive (Auto Center Drive) (#3)	Signalized	12.5	B	13.7	B	12.8	B	14.4	B	13.0	B	17.5	B
Mission Trail / Malaga Road (#4)	Signalized	14.2	B	17.7	B	15.4	B	18.5	B	16.3	B	19.8	B
Diamond Drive / Malaga Road (#5)	Signalized	11.0	B	13.2	B	12.2	B	14.1	B	12.3	B	15.4	B

^[1] Not applicable.

^[2] This is delay and LOS with overlap phase for the westbound right turn lane.

Table 12. Queue for Study Conditions.

Intersection	Control	Movement	EAP Condition		EAPC Condition	
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
			HCM 95 th % Q (veh) ^[1]	HCM 95 th % Q (veh) ^[1]	HCM 95 th % Q (veh)	HCM 95 th % Q (veh) ^[1]
Mission Trail / Driveway (#1)	TWSC	SBL	0.5	0.5	0.5	0.5
		WBL	3.6	3.7	3.7	4.0

^[1] Vehicle is 25 ft.

7.C.2 Parking Analysis

The proposed parking supply is 47 parking spaces with 4 being handicapped accessible. All handicapped accessible parking spaces are located within 150 ft of the building entrance.

STE evaluated the parking for the project site using the Lake Elsinore Municipal Code Sections 17.134.070 and 17.148.030. The parking rate is 1 space per 250 sf of GFA. Table 13 presents the parking rates and results. Based on this analysis, the total number of parking spaces required by the proposed development would be 30 parking spaces. Based on our review, STE believes the proposed development has sufficient parking supply to meet the anticipated parking demand (i.e., 47 spaces > 30 spaces).

Table 13. Parking Generation Summary.

Independent Variable		Land Use		Lake Elsinore Municipal Code Section 17.148.030	Parking Rate	Parking Spaces
3,000	GFA	Super Convenience Market/Gas Station	960	Commercial District	1 space per 250 sf of GFA	12
4,400	GFA	Automated Car Wash	948			18
Total						30

7.D SAFETY AND OPERATIONS IMPROVEMENTS

STE evaluated the opening year roadway safety and/or operations conditions for the follow items:

- Addition of lanes – LOS was not significant and no additional lanes are needed.
- Bus turnouts – There are existing public transit in Lake Elsinore area. However, the proposed project is unlikely to be a generator or user for public transit.
- Parking restrictions on adjacent streets – No street parking is anticipated for proposed. STE has discussed parking supply and demand in Section 7.C.2.
- Traffic Signal Coordination – No new signals are anticipated due to this proposed development.
- Traffic Signal Modification – STE recommends modifying the existing traffic signal operation at Mission Trail (E. Lakeshore Drive) (#2) by implementing an overlap phase on the westbound right turn lane. The overlap phase will improve the LOS to D. Please note that this is needed once all cumulative projects are built out,

7.E REGIONAL FUNDING MECHANISMS

As per the TIA Guide, STE reviewed the possible regional funding mechanisms that may be applicable to the proposed project. Transportation improvements throughout the County of Riverside are funded through a combination of direct project mitigation, fair share contributions or development impact fee programs such as the City's adoption of the Transportation Uniform Mitigation Fee (TUMF) program and the City of Lake Elsinore Traffic Impact Fee (TIF) program.

7.E.1 Transportation Uniform Mitigation Fee (TUMF) Program

Western Riverside County includes 18 incorporated cities and the unincorporated county covering an area of approximately 2,100 square miles. Through the mid 2000's, this portion of Riverside County was growing at a pace exceeding the capacity of existing financial resources to meet increasing demand for transportation infrastructure. The TUMF concept was expanded to the entire Western Riverside Council of Governments (WRCOG) in 2000. The TUMF Program is implemented through the auspices of WRCOG and identifies network backbone and local roadways that are needed to accommodate growth through 2040. Lake Elsinore is in the Southwest Zone of the TUMF program. Mission Trail is part of the secondary network of the TUMF network. Diamond Drive toward I-15 is part of the backbone network of the TUMF network. These roadways have already been improved to four lane arterials.

7.E.2 City of Lake Elsinore Traffic Impact Fee (TIF) Program

As discussed in Section 5 and shown in Table 7, the LOS at all study intersections are at a LOS C or better for the EAP Condition. As shown in Section 6 for the EAPC Condition, all intersections except for Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2) at LOS D or better. As shown in Table 10, intersection Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2) is a LOS E for EAPC Condition without improvements. However, the LOS improves to D with the implementation of overlap phase on the westbound right turn lane (see Table 10). Since the overlap phase improvement has already been implemented for the traffic signal operation for a previous project, the LOS for the EAPC Condition for Diamond Drive / Mission Trail (E. Lakeshore Drive) (#2) will be LOS D.

REFERENCES

- California Department of Transportation. Guide for the Preparation of Traffic Impact Studies. December 2002.
- California Department of Transportation. California Manual on Uniform Traffic Control Devices (CA MUTCD). Rev. 6, March 30, 2021. <https://dot.ca.gov/programs/safety-programs/camutcd>.
- California Department of Transportation. California Highway Design Manual (HDM), July 1, 2020. <https://dot.ca.gov/programs/design/manual-highway-design-manual-hdm>
- City of Lake Elsinore General Plan Update Annotated Recirculated Draft EIR, Appendix D Traffic Studies. Certified December 13, 2011 (Resolution No. 2011-070).
- City of Lake Elsinore General Plan Update Section 3.1 Land Use and Planning, <http://www.lake-elsinore.org/home/showdocument?id=7238>.
- City of Lake Elsinore General Plan Update Section 3.4 Transportation and Circulation, <http://www.lake-elsinore.org/home/showdocument?id=7235>.
- City of Lake Elsinore General Plan Land Use Map, <http://www.lake-elsinore.org/home/showdocument?id=26609>.
- City of Lake Elsinore General Plan Zoning Map, <http://www.lake-elsinore.org/home/showdocument?id=26611>.
- City of Lake Elsinore General Plan Appendix A Specific Plan Land Uses and Summaries, <http://www.lake-elsinore.org/home/showdocument?id=7295>.
- City of Lake Elsinore Municipal Code Chapter 17.134 CMU Commercial Mixed Use District, Accessed 4/1/2021, [Chapter 17.134 CMU COMMERCIAL MIXED USE DISTRICT \(codepublishing.com\)](http://www.codepublishing.com/CA/LakeElsinore/#!/LakeElsinore17/LakeElsinore17148.html#17.148).
- City of Lake Elsinore Municipal Code Chapter 17.148 Parking Requirements, Accessed 4/1/2021, <https://www.codepublishing.com/CA/LakeElsinore/#!/LakeElsinore17/LakeElsinore17148.html#17.148>.
- City of Lake Elsinore, Resolution No. 2002-22, Traffic Impact Fee Study Ordinance, <http://www.lake-elsinore.org/home/showdocument?id=2048>.
- City of Lake Elsinore, Traffic Impact Analysis Preparation Guide, Adopted June 23, 2020. <http://www.lake-elsinore.org/home/showdocument?id=26703>
- Highway Capacity Manual (HDM), Transportation Research Board, Washington DC, 2000, 2010, 2016.
- Institute of Transportation Engineers (ITE). Trip Generation Manual. 10th Edition. September 2017.
- Institute of Transportation Engineers (ITE). Trip Generation Handbook. 3rd Edition. September 2017.
- Lake Elsinore Diamond Sports Center Traffic Impact Analysis, Urban Crossroads, October 17, 2018.
- Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, Federal Highway Administration, 2009 Ed., May 2012. https://mutcd.fhwa.dot.gov/kno_2009r1r2.htm
- (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, SANDAG, April 2002.
- Riverside Transit Agency, [Route Info - Riverside Transit Agency](http://www.riversidetra.com/RouteInfo), April 3, 2021.
- Western Riverside Council of Governments, Transportation Uniform Mitigation Fee Nexus Study 2016 Update, Adopted July 10, 2017. <https://www.wrcog.us/DocumentCenter/View/1020>.

APPENDIX A. APPROVED SCOPING AGREEMENT

Exhibit B

SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This letter acknowledges the City of Lake Elsinore requirements for traffic impact analysis of the following project. The analysis must follow the City of Lake Elsinore Traffic Study Guidelines dated May 2020.

Case No. PA 2017-62 Imperial Stations

Related Cases -

SP No. Provide SP No. and list of other approved or active projects within the SP.

EIR No. _____

GPA No. _____

CZ No. _____

Project Name: Imperial Station

Project Address: 31800 Mission Trail

Project Description: 18 Pump Gas Station With Convenience Store And Car Wash

Consultant
Name: Sierra Transportation Engineers, Inc.
Address: Po Box 6062
Irvine, CA 92616
Telephone: 949-527-2638

Developer
Berri Brothers
3199 Red Hill Ave., Suite B
Costa Mesa, CA 92626

A. Trip Generation Source: ITE 10th Edition

Current GP Land Use	<u>CMU – Commercial Mixed Use</u>	Proposed Land Use	<u>Land Use Code: 960 Super Convenience Market/Gas Station</u> <u>Land Use Code: 948 Automated Car Wash</u>
Current Zoning	<u>CMU – Commercial Mixed Use</u>	Proposed Zoning	<u>CMU – Commercial Mixed Use</u>

	Current Trip Generation		Proposed Trip Generation (PCE)			
	In	Out	Total	In	Out	Total
AM Trips	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>271</u>	<u>270</u>	<u>541</u>
PM Trips	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>238</u>	<u>238</u>	<u>476</u>

Internal Trip Allowance ☐ Yes ☒ No (_____ % Trip Discount)
Pass-By Trip Allowance ☒ Yes ☐ No (See Table 1 % Trip Discount)

Internal and Pass-By trip allowance percentages shall be per NCHRP 684 and the ITE Trip Generation Manual. The pass-by trips at adjacent study area intersections and project driveways shall be indicated on a report figure. Internal trips that use external streets shall be indicated on a report figure.

B. Trip Geographic Distribution: N % S % E % W %
(Attach exhibit for detailed assignment) **Please see attached exhibit.**

C. Background Traffic

Project Build-out Year: 2021

Annual Ambient Growth Rate: 2%

Phase Year(s), if needed: _____

Other area projects to be analyzed: Requested information. City provided 5 intersections along Diamond Drive that were completed in 2017.

Model/Forecast methodology _____

Exhibit B – Scoping Agreement – Page 2

D. Study intersections: (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)

- | | |
|--|-----------|
| 1. <u>Driveways / Mission Trail</u> | 6. _____ |
| 2. <u>Diamond Drive / Mission Trail</u> | 7. _____ |
| 3. <u>Diamond Drive / Casino Drive (Auto Center)</u> | 8. _____ |
| 4. <u>Malaga / Mission Trail</u> | 9. _____ |
| 5. <u>Diamond Drive / Malaga</u> | 10. _____ |

E. Study Roadway Segments: (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)

- | | |
|---|-----------|
| 1. <u>None based on previous correspondence with City</u> | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

E. Other Jurisdictional Impacts

Is this project within one-mile radius of another jurisdiction or a State Highway? ☐ Yes ☒ No

If so, name of Agency: _____

F. Site Plan

 (please attach figure)

See attached figure.

G. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline)

 (To be filled out by City)

H. Existing Conditions

Traffic count data must be new or recent within 1 calendar year. Provide traffic count dates if using other than new counts. Date of counts: Requesting information from TIA in area in last few years.

I. Traffic Study Requirements

Traffic Study Required: <u>X</u>	<u>Traffic Study plus separate VMT memo</u>
Focused Study Required: _____	_____
Except from Analysis: _____	_____

Recommended by:



Consultant's Representative

10/22//2020

Date

Scoping Agreement Submitted on _____

10/22//2020

Revised on _____

Approved Scoping Agreement:

Nicholas Lowe
City of Lake Elsinore Engineering
Department

11/9/2020
Date

TRIP RATES

				Daily			AM Peak Hour			PM Peak Hour		
Independent Variable		Land Use		Trips / Independent Variable	% Enter	% Exit	Trips / Independent Variable	% Enter	% Exit	Trips / Independent Variable	% Enter	% Exit
18	VFP	Super Convenience Market/Gas Station	960	230.52	50%	50%	28.08	50%	50%	22.96	50%	50%
4,400	GFA	Automated Car Wash	948	900*	50%*	50%*	36**	50%**	50%**	14.20	50%	50%

*Values taken from SANDAG Not So Brief Guide of Vehicular Traffic Generation Rates for Daily for one site

**Values taken from SANDAG Not So Brief Guide of Vehicular Traffic Generation Rates for AM Peak Hour.

TRIP GENERATED

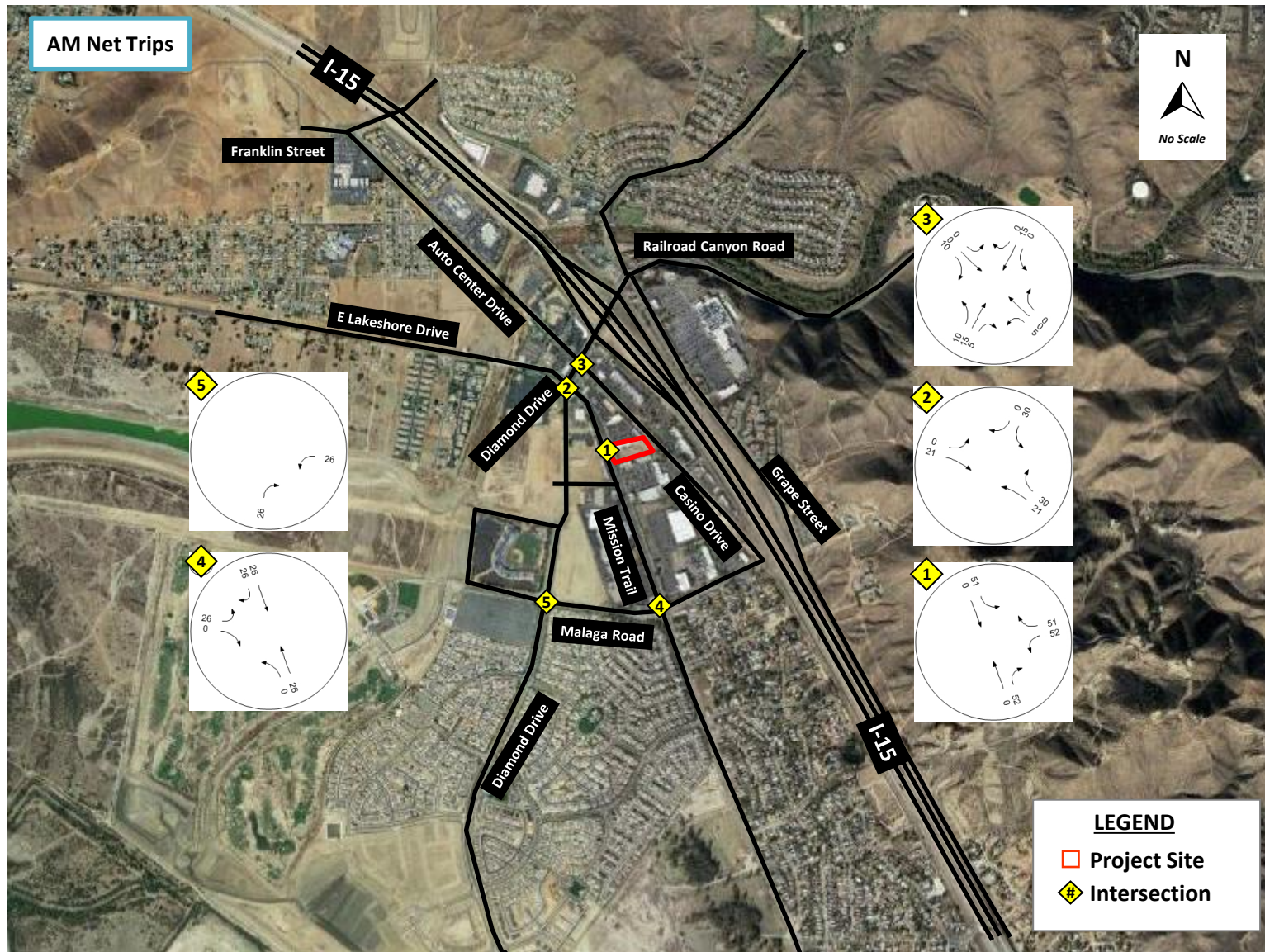
TRIP GENERATED				Daily			AM Peak Hour			PM Peak Hour		
Independent Variable		Land Use		Trips	Enter	Exit	Trips	Enter	Exit	Trips	Enter	Exit
18	VFP	Super Convenience Market/Gas Station	960	4,150	2,075	2,075	505	253	252	414	207	207
4,400	GFA	Automated Car Wash	948	900*	450*	450*	36**	18**	18**	62	31	31
Total Trips Generated				5,050	2,525	2,525	541	271	270	476	238	238
Pass-By Trips		Pass-By Percentage (62% AM/Daily, 56% PM)***		-3,131	-1,566	-1,565	-335	-168	-167	-267	-134	-133
Net Trips				1,919	959	960	206	103	103	209	104	105

*Values taken from SANDAG Not So Brief Guide of Vehicular Traffic Generation Rates for Daily and AM Peak Hour.

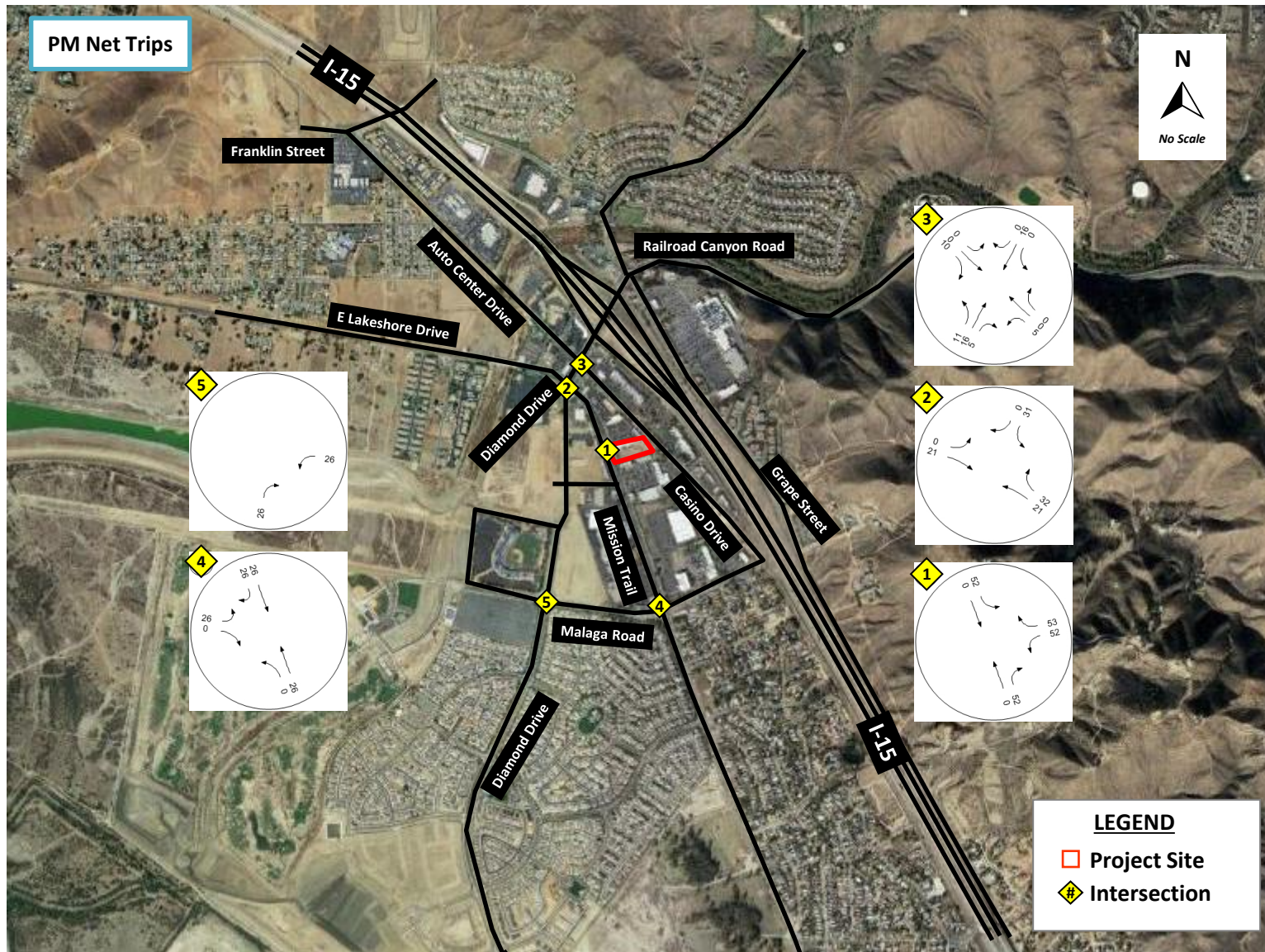
**Values taken from SANDAG Not So Brief Guide of Vehicular Traffic Generation Rates for AM Peak Hour.

***There is no pass-by percentages for Land Use 960 in the ITE Trip Generation Handbook, 3rd Edition, 2014. The closest land use would be Land Use 945 Gasoline/Service Station with Convenience Market. Pass-by rate was applied to total trips generated.

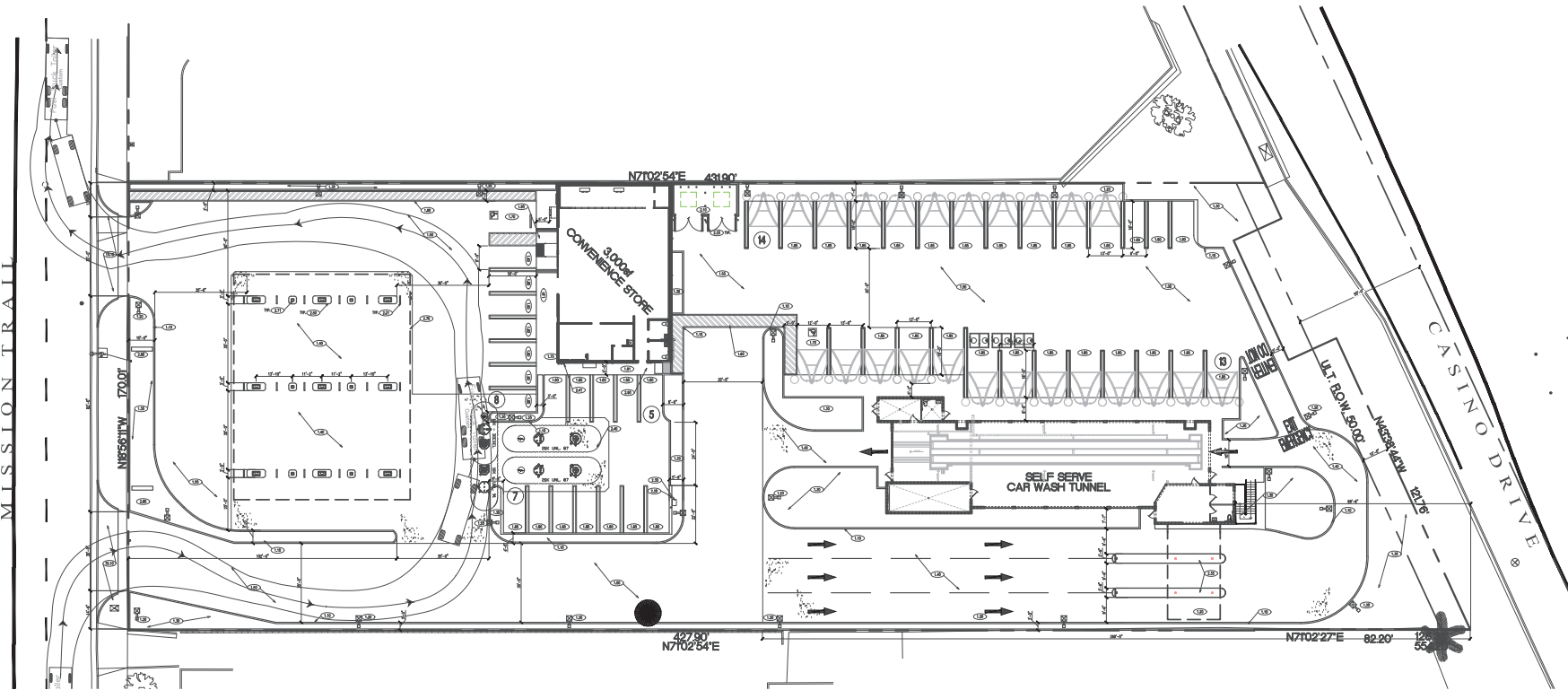




Traffic Impact Analysis Report will include separate pass-by trip figures.



Traffic Impact Analysis Report will include separate pass-by trip figures.



SITE PLAN

SCALE 1"=30'-0"



REVISIONS			
NO.	DATE	DESCRIPTION	BY



PROJECT: APN: 363-172-016
3800 MISSION TRAIL
LAKE ELSINORE, CA. 92530

DATE ISSUED:	08/08/17
SCALE:	
DRAWN BY:	F. COHEN
CHECKED BY:	F. COHEN
PROJECT NUMBER:	17081
---:	ISI#9
SHEET:	C.10

SITE PLAN

APPENDIX B. EXISTING TURNING MOVEMENT COUNTS

National Data & Surveying Services

Intersection Turning Movement Count

Location: Diamond Dr & Mission Trail
City: Lake Elsinore
Control: Signalized

Project ID: 20-030162-001
Date: 2/18/2021

Total

NS/EW Streets:	Diamond Dr				Diamond Dr				Mission Trail				Mission Trail				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	3 NT	0 NR	0 NU	2 SL	2 ST	0 SR	0 SU	1 EL	2 ET	0 ER	0 EU	1 WL	2 WT	1 WR	0 WU	
6:00 AM	2	37	0	0	21	23	9	0	19	18	7	0	1	12	42	0	191
6:15 AM	3	40	1	0	34	26	12	0	15	29	4	0	0	16	49	0	229
6:30 AM	7	47	0	0	36	57	8	0	20	21	4	0	2	21	40	1	264
6:45 AM	4	33	0	0	38	51	15	0	13	19	2	0	3	25	28	1	232
7:00 AM	7	54	0	0	32	46	21	0	24	33	5	1	0	25	51	0	299
7:15 AM	5	58	1	0	52	34	32	0	30	25	8	0	0	29	57	1	332
7:30 AM	4	48	0	0	54	27	18	0	26	28	4	0	6	19	46	0	280
7:45 AM	7	35	1	0	72	39	18	0	22	32	7	0	4	31	49	0	317
8:00 AM	7	45	3	0	59	41	29	0	27	32	8	1	3	37	51	0	343
8:15 AM	7	44	2	0	58	36	30	0	28	47	14	0	5	38	61	0	370
8:30 AM	10	45	2	0	72	51	20	0	28	34	8	0	3	41	66	2	382
8:45 AM	9	57	3	0	75	47	34	0	24	48	17	0	7	57	53	1	432
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	72	543	13	0	603	478	246	0	276	366	88	2	34	351	593	6	3671
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	33	191	10	0	264	175	113	0	107	161	47	1	18	173	231	3	1527
PEAK HR FACTOR :	0.825	0.838	0.833	0.000	0.880	0.858	0.831	0.000	0.955	0.839	0.691	0.250	0.643	0.759	0.875	0.375	0.884
	0.848				0.885				0.888				0.900				

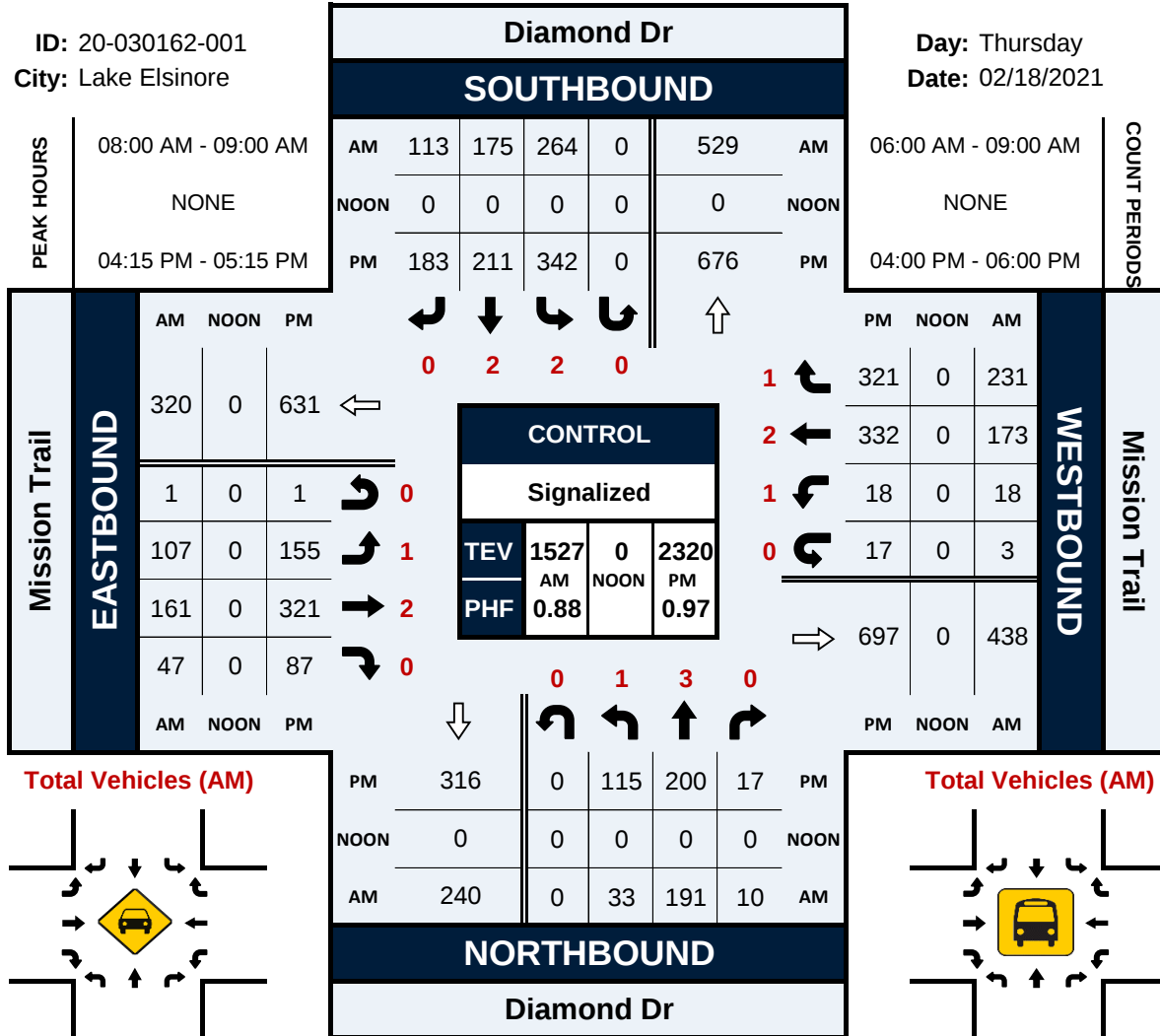
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	3 NT	0 NR	0 NU	2 SL	2 ST	0 SR	0 SU	1 EL	2 ET	0 ER	0 EU	1 WL	2 WT	1 WR	0 WU	
4:00 PM	16	62	4	0	88	53	45	0	34	75	21	0	4	78	78	5	563
4:15 PM	29	62	4	0	88	62	45	0	32	77	17	1	6	89	82	5	599
4:30 PM	24	43	2	0	78	58	53	0	38	80	24	0	5	84	68	4	561
4:45 PM	36	41	5	0	88	35	45	0	41	81	21	0	5	68	92	3	561
5:00 PM	26	54	6	0	88	56	40	0	44	83	25	0	2	91	79	5	599
5:15 PM	33	47	2	0	74	62	34	0	39	93	22	1	5	98	69	2	581
5:30 PM	23	37	2	0	61	56	38	0	36	79	19	0	1	90	75	4	521
5:45 PM	26	58	3	0	70	61	44	0	33	75	24	0	7	63	67	2	533
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	213	404	28	0	635	443	344	0	297	643	173	2	35	661	610	30	4518
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	115	200	17	0	342	211	183	0	155	321	87	1	18	332	321	17	2320
PEAK HR FACTOR :	0.799	0.806	0.708	0.000	0.972	0.851	0.863	0.000	0.881	0.967	0.870	0.250	0.750	0.912	0.872	0.850	0.968
	0.874				0.944				0.928				0.945				

Diamond Dr & Mission Trail

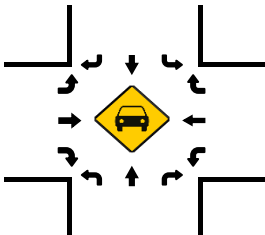
Peak Hour Turning Movement Count

ID: 20-030162-001
City: Lake Elsinore

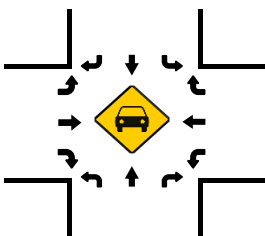
Day: Thursday
Date: 02/18/2021



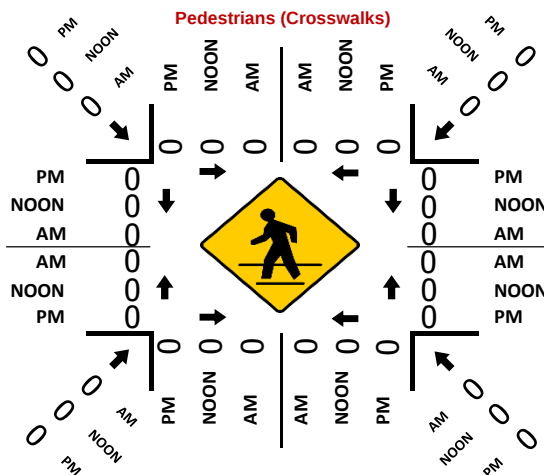
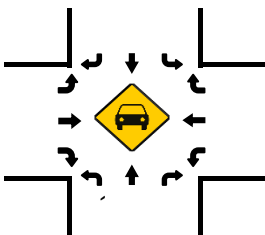
Total Vehicles (AM)



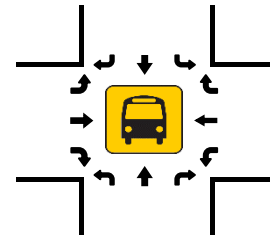
Total Vehicles (NOON)



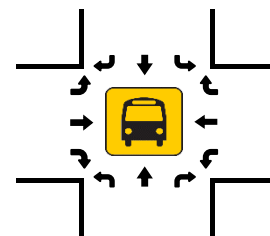
Total Vehicles (PM)



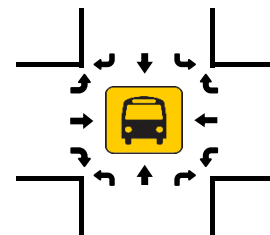
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Diamond Dr & Casino Dr
City: Lake Elsinore
Control: Signalized

Project ID: 20-030162-002
Date: 2/25/2021

Total

NS/EW Streets:	Diamond Dr				Diamond Dr				Casino Dr				Casino Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	3 NT	0 NR	0 NU	2 SL	2 ST	0 SR	0 SU	1 EL	2 ET	0 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
6:00 AM	2	88	0	0	6	59	6	0	23	2	3	0	6	3	12	0	210
6:15 AM	5	96	0	0	7	66	8	1	24	7	2	0	1	6	11	0	234
6:30 AM	3	115	0	0	8	72	13	0	29	5	4	0	3	3	15	0	270
6:45 AM	3	63	3	0	11	99	21	1	23	4	3	0	0	2	14	0	247
7:00 AM	4	92	1	0	12	97	17	1	23	7	5	0	2	3	18	0	282
7:15 AM	8	123	1	0	16	98	25	1	22	8	9	0	1	4	18	0	334
7:30 AM	7	130	4	0	24	92	20	2	22	9	7	0	1	10	14	0	342
7:45 AM	4	105	0	0	16	101	35	2	27	10	8	0	5	5	12	0	330
8:00 AM	10	117	6	0	21	116	26	0	34	7	8	0	1	6	16	0	368
8:15 AM	13	105	6	0	21	111	20	0	25	8	11	0	1	9	12	0	342
8:30 AM	9	113	1	0	28	131	26	0	32	8	15	0	1	3	9	0	376
8:45 AM	9	123	3	0	35	140	20	0	21	9	14	0	2	5	13	0	394
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	77	1270	25	0	205	1182	237	8	305	84	89	0	24	59	164	0	3729
	5.61%	92.57%	1.82%	0.00%	12.56%	72.43%	14.52%	0.49%	63.81%	17.57%	18.62%	0.00%	9.72%	23.89%	66.40%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	41	458	16	0	105	498	92	0	112	32	48	0	5	23	50	0	1480
PEAK HR FACTOR :	0.788	0.931	0.667	0.000	0.750	0.889	0.885	0.000	0.824	0.889	0.800	0.000	0.625	0.639	0.781	0.000	0.939
			0.954				0.891				0.873				0.848		

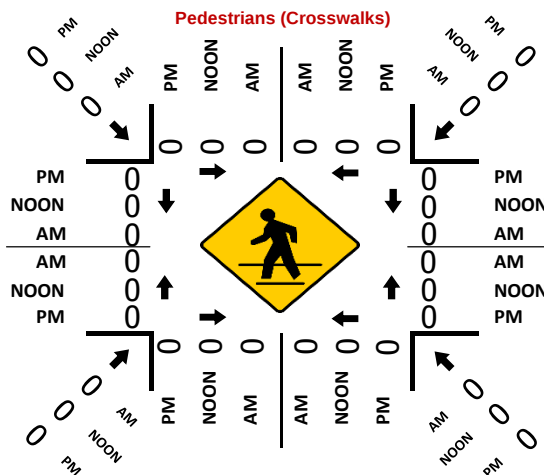
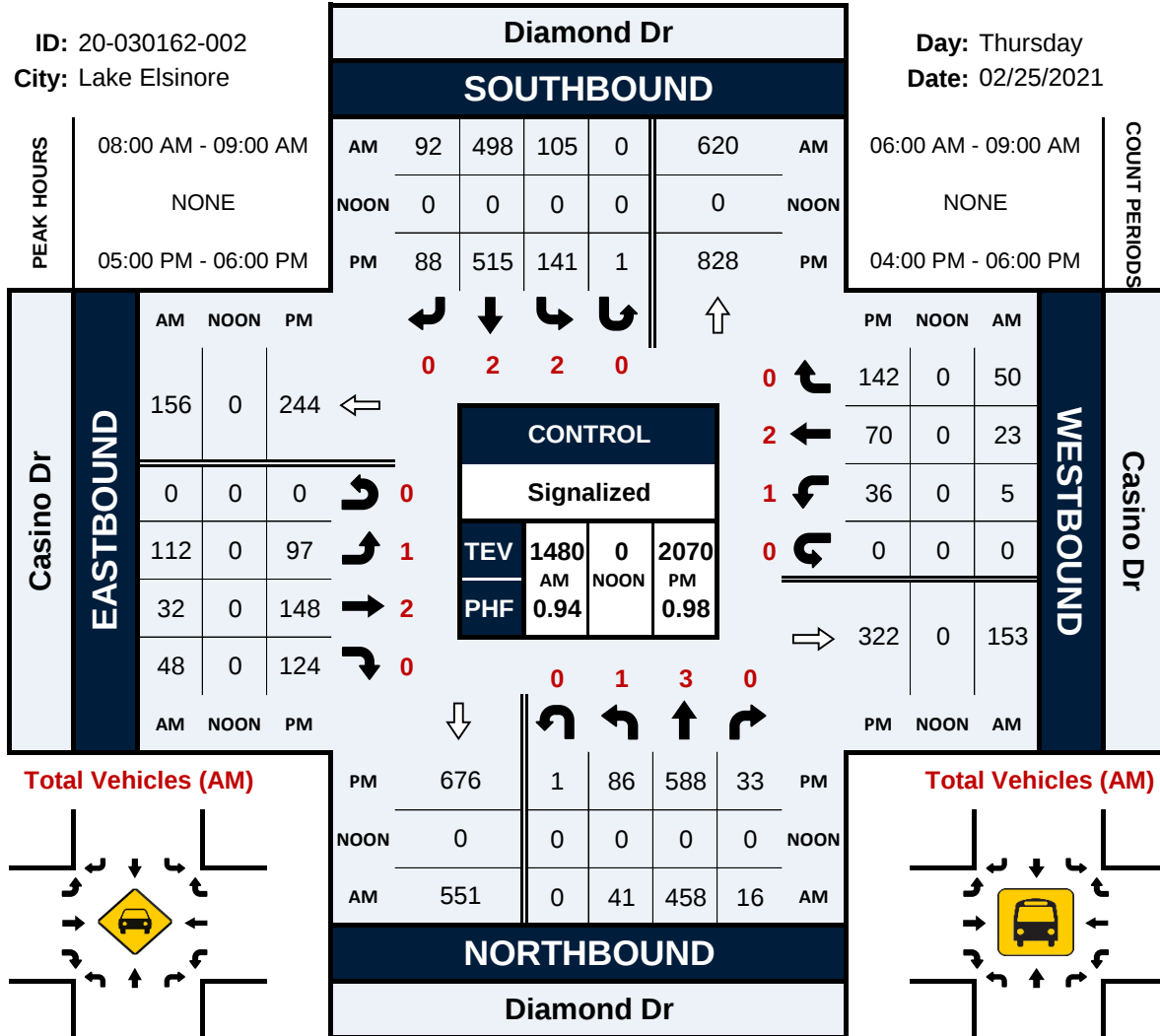
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	3 NT	0 NR	0 NU	2 SL	2 ST	0 SR	0 SU	1 EL	2 ET	0 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
4:00 PM	30	132	6	0	36	157	31	1	28	36	18	0	6	18	27	0	526
4:15 PM	19	135	7	0	23	144	31	1	22	30	24	0	6	15	33	0	490
4:30 PM	16	131	7	0	46	119	25	0	31	37	35	0	6	12	25	0	490
4:45 PM	19	152	4	0	35	136	23	0	36	28	37	0	8	14	29	0	521
5:00 PM	15	166	5	0	47	117	20	0	24	41	32	0	15	14	34	0	530
5:15 PM	23	126	9	0	37	131	29	0	20	39	35	0	5	20	33	0	507
5:30 PM	18	160	9	0	32	113	18	0	22	40	26	0	10	27	36	0	511
5:45 PM	30	136	10	1	25	154	21	1	31	28	31	0	6	9	39	0	522
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	170	1138	57	1	281	1071	198	3	214	279	238	0	62	129	256	0	4097
	12.45%	83.31%	4.17%	0.07%	18.09%	68.96%	12.75%	0.19%	29.27%	38.17%	32.56%	0.00%	13.87%	28.86%	57.27%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	86	588	33	1	141	515	88	1	97	148	124	0	36	70	142	0	2070
PEAK HR FACTOR :	0.717	0.886	0.825	0.250	0.750	0.836	0.759	0.250	0.782	0.902	0.886	0.000	0.600	0.648	0.910	0.000	0.976
			0.947				0.927				0.951				0.849		

Diamond Dr & Casino Dr

Peak Hour Turning Movement Count

ID: 20-030162-002
City: Lake Elsinore

Day: Thursday
Date: 02/25/2021



National Data & Surveying Services

Intersection Turning Movement Count

Location: Mission Trail & Malaga Rd
City: Lake Elsinore
Control: Signalized

Project ID: 20-030162-003
Date: 2/18/2021

Total

NS/EW Streets:	Mission Trail				Mission Trail				Malaga Rd				Malaga Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	2 NT	0 NR	0 NU	1 SL	2 ST	0 SR	0 SU	1 EL	1 ET	1 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
6:00 AM	2	45	2	0	0	33	0	0	2	0	0	0	4	1	0	0	89
6:15 AM	4	61	5	0	1	49	0	0	1	0	1	2	4	2	0	0	130
6:30 AM	4	71	1	0	0	49	0	0	1	0	0	1	8	1	0	0	136
6:45 AM	4	56	7	0	0	54	0	0	1	0	2	1	5	1	1	0	132
7:00 AM	6	78	5	0	1	46	1	0	0	0	5	2	6	2	1	0	153
7:15 AM	3	86	5	0	2	56	1	0	0	0	4	1	5	0	4	0	167
7:30 AM	2	73	12	0	3	54	0	0	1	0	3	1	8	1	1	0	159
7:45 AM	7	88	10	0	3	65	0	0	2	1	5	4	3	1	0	0	189
8:00 AM	9	96	5	0	3	45	1	0	3	0	4	2	4	4	4	0	180
8:15 AM	10	92	8	1	3	69	1	0	0	1	3	3	5	0	7	0	203
8:30 AM	9	88	5	0	3	67	1	0	2	0	5	0	7	3	6	0	196
8:45 AM	19	100	17	0	2	71	2	1	3	0	4	2	13	1	3	0	238
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	79	934	82	1	21	658	7	1	16	2	36	19	72	17	27	0	1972
	7.21%	85.22%	7.48%	0.09%	3.06%	95.78%	1.02%	0.15%	21.92%	2.74%	49.32%	26.03%	62.07%	14.66%	23.28%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	47	376	35	1	11	252	5	1	8	1	16	7	29	8	20	0	817
PEAK HR FACTOR :	0.618	0.940	0.515	0.250	0.917	0.887	0.625	0.250	0.667	0.250	0.800	0.583	0.558	0.500	0.714	0.000	0.858
			0.844				0.885				0.889				0.838		

NS/EW Streets:	Mission Trail				Mission Trail				Malaga Rd				Malaga Rd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	2 NT	0 NR	0 NU	1 SL	2 ST	0 SR	0 SU	1 EL	1 ET	1 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
4:00 PM	18	138	18	0	4	165	5	0	0	0	11	5	20	5	9	0	398
4:15 PM	15	138	14	0	5	152	3	0	4	0	12	6	21	2	3	0	375
4:30 PM	20	135	12	0	3	158	4	1	3	1	17	1	24	4	5	0	388
4:45 PM	9	125	19	0	5	160	5	0	1	2	12	3	24	5	3	0	373
5:00 PM	14	129	16	0	7	142	5	0	3	0	9	3	22	5	3	0	358
5:15 PM	16	124	10	0	3	163	3	0	3	0	8	5	24	3	6	0	368
5:30 PM	14	113	14	1	1	129	6	0	5	4	9	2	19	8	8	0	333
5:45 PM	13	114	27	1	5	125	4	1	1	1	6	2	21	8	9	0	338
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	119	1016	130	2	33	1194	35	2	20	8	84	27	175	40	46	0	2931
	9.39%	80.19%	10.26%	0.16%	2.61%	94.46%	2.77%	0.16%	14.39%	5.76%	60.43%	19.42%	67.05%	15.33%	17.62%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	62	536	63	0	17	635	17	1	8	3	52	15	89	16	20	0	1534
PEAK HR FACTOR :	0.775	0.971	0.829	0.000	0.850	0.962	0.850	0.250	0.500	0.375	0.765	0.625	0.927	0.800	0.556	0.000	0.964
			0.950				0.963				0.886				0.919		

Mission Trail & Malaga Rd

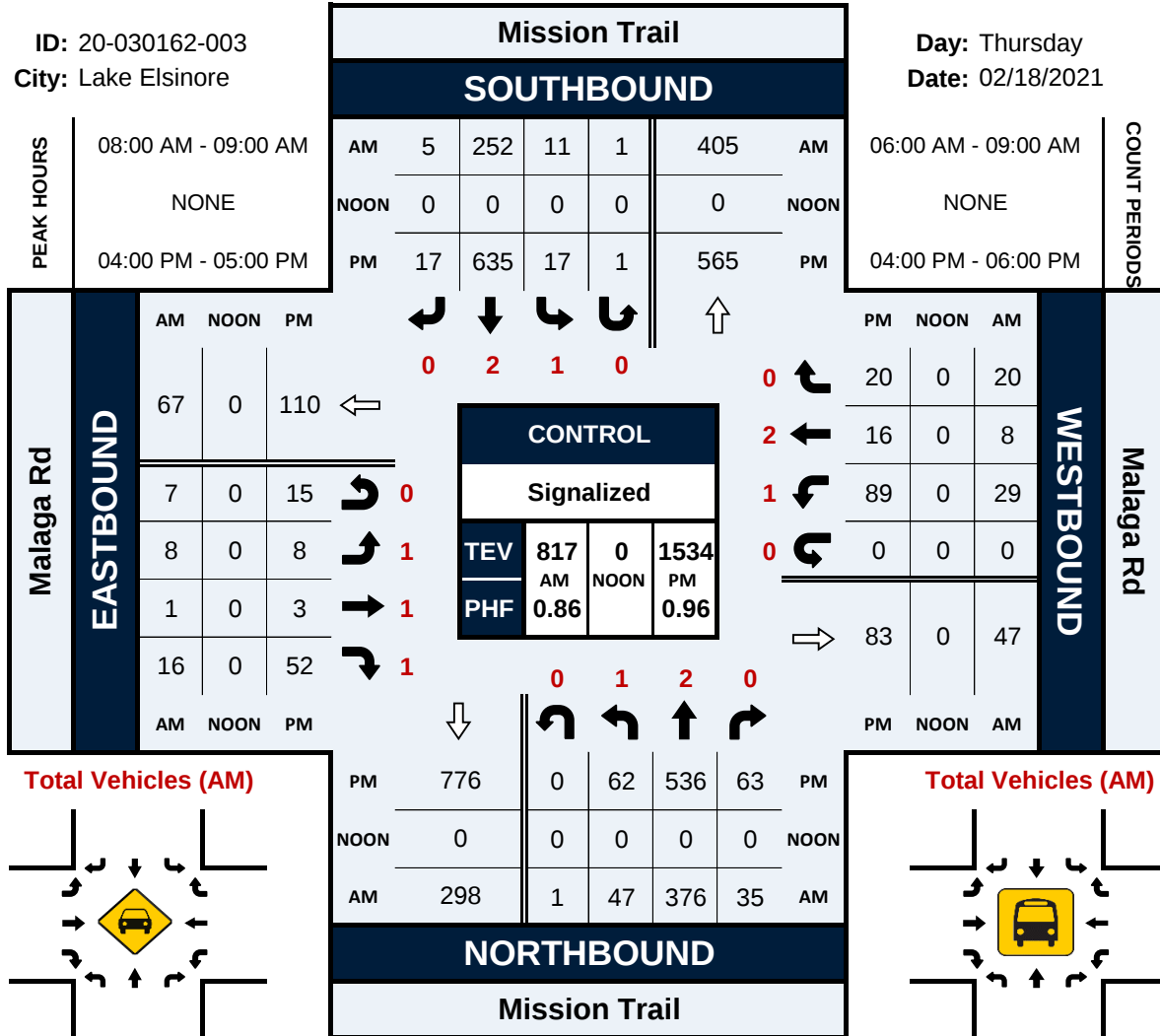
Peak Hour Turning Movement Count

ID: 20-030162-003

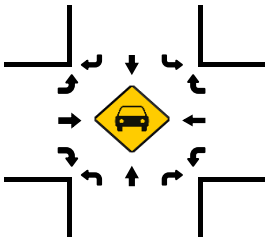
City: Lake Elsinore

Day: Thursday

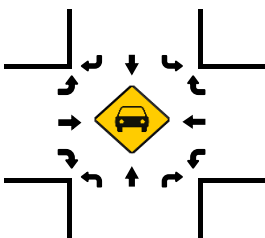
Date: 02/18/2021



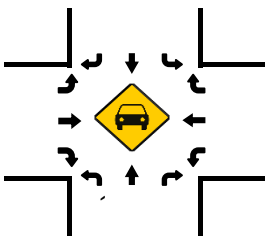
Total Vehicles (AM)



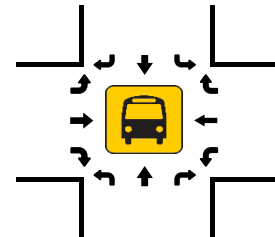
Total Vehicles (NOON)



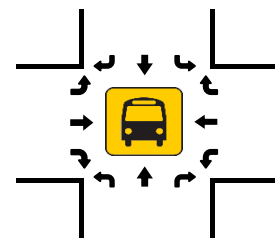
Total Vehicles (PM)



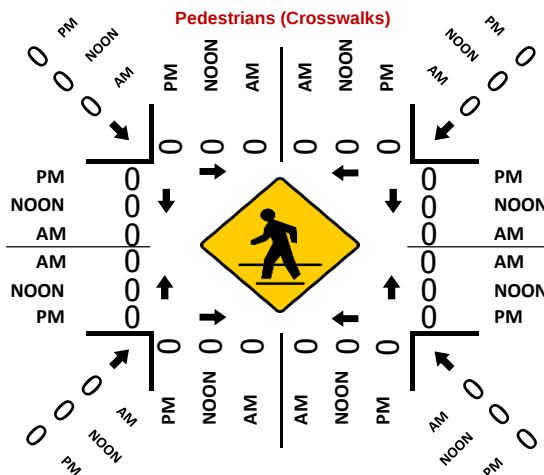
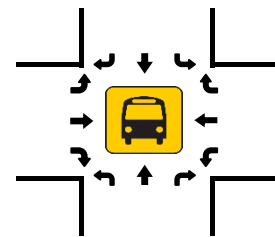
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Diamond Dr & Malaga Rd
City: Lake Elsinore
Control: Signalized

Project ID: 20-030162-004
Date: 2/18/2021

Total

NS/EW Streets:	Diamond Dr				Diamond Dr				Malaga Rd				Malaga Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	2 NT	0 NR	0 NU	1 SL	2 ST	1 SR	0 SU	1 EL	2 ET	0 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
6:00 AM	0	38	2	0	0	23	0	0	0	0	0	0	3	0	0	0	66
6:15 AM	0	42	4	0	0	24	0	0	0	0	0	0	2	0	3	0	75
6:30 AM	0	45	2	0	0	35	0	0	0	0	0	0	2	0	2	0	86
6:45 AM	0	36	4	0	0	47	1	0	1	0	0	0	2	0	6	0	97
7:00 AM	0	50	4	0	2	42	0	0	0	0	0	0	3	0	1	0	102
7:15 AM	0	59	1	0	4	25	11	0	0	0	0	0	3	0	3	0	106
7:30 AM	0	58	4	0	1	22	7	0	0	0	1	0	5	1	1	0	100
7:45 AM	0	44	8	0	4	27	7	0	0	0	0	0	1	0	2	0	93
8:00 AM	0	42	4	0	2	28	2	0	5	3	1	0	8	2	4	0	101
8:15 AM	0	40	2	0	2	18	5	0	4	3	0	0	7	0	6	0	87
8:30 AM	0	48	5	0	1	41	4	0	3	0	1	0	7	0	0	1	111
8:45 AM	0	55	7	0	0	27	6	1	6	1	1	0	6	5	4	1	120
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0.00%	92.22%	7.78%	0.00%	3.82%	85.68%	10.26%	0.24%	63.33%	23.33%	13.33%	0.00%	53.85%	8.79%	35.16%	2.20%	1144
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	185	18	0	5	114	17	1	18	7	3	0	28	7	14	2	419
PEAK HR FACTOR :	0.000	0.841	0.643	0.000	0.625	0.695	0.708	0.250	0.750	0.583	0.750	0.000	0.875	0.350	0.583	0.500	0.873
	0.819				0.745				0.778				0.797				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	2 NT	0 NR	0 NU	1 SL	2 ST	1 SR	0 SU	1 EL	2 ET	0 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
4:00 PM	0	50	7	0	4	54	1	0	3	3	1	0	11	1	7	1	143
4:15 PM	0	58	11	0	6	62	0	0	7	3	1	0	12	0	11	2	173
4:30 PM	0	59	7	0	9	71	0	1	3	0	0	0	7	0	10	6	173
4:45 PM	0	53	9	1	7	52	0	0	0	0	0	0	15	0	7	3	147
5:00 PM	0	55	7	0	6	47	0	2	1	0	0	0	11	0	10	1	140
5:15 PM	0	52	9	0	5	64	0	0	0	0	0	0	19	0	8	2	159
5:30 PM	0	41	8	0	5	49	1	0	1	3	0	0	14	0	5	5	132
5:45 PM	0	62	1	0	4	64	0	0	0	0	0	0	25	0	4	4	164
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0.00%	87.76%	12.04%	0.20%	8.95%	90.08%	0.39%	0.58%	57.69%	34.62%	7.69%	0.00%	56.72%	0.50%	30.85%	11.94%	1231
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	220	34	1	26	239	1	1	13	6	2	0	45	1	35	12	636
PEAK HR FACTOR :	0.000	0.932	0.773	0.250	0.722	0.842	0.250	0.250	0.464	0.500	0.500	0.000	0.750	0.250	0.795	0.500	0.919
	0.924				0.824				0.477				0.930				

Date: 02/18/2021

APPENDIX C. EXISTING CONDITION LOS ANALYSIS REPORTS

Timings

2: DIAMOND & E LAKESHORE/MISSION TRAIL

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	108	161	21	173	231	33	191	264	175
Future Volume (vph)	108	161	21	173	231	33	191	264	175
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4	3	8		5	2	1	6
Permitted Phases					8				
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	43.8	9.6	37.8	37.8	9.6	38.2	9.6	33.2
Total Split (s)	15.4	43.8	9.6	38.0	38.0	14.8	38.6	13.0	36.8
Total Split (%)	14.7%	41.7%	9.1%	36.2%	36.2%	14.1%	36.8%	12.4%	35.0%
Yellow Time (s)	3.6	4.8	3.6	4.8	4.8	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	5.8	4.6	5.2	4.6	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	9.3	22.7	5.0	10.6	10.6	6.8	10.5	8.4	18.7
Actuated g/C Ratio	0.16	0.38	0.08	0.18	0.18	0.12	0.18	0.14	0.32
v/c Ratio	0.44	0.18	0.16	0.31	0.53	0.19	0.25	0.61	0.29
Control Delay	28.3	11.3	29.0	23.0	7.9	26.5	21.4	30.7	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	11.3	29.0	23.0	7.9	26.5	21.4	30.7	12.0
LOS	C	B	C	C	A	C	C	C	B
Approach Delay		17.1		15.1			22.1		21.0
Approach LOS		B		B			C		C

Intersection Summary

Cycle Length: 105

Actuated Cycle Length: 59

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 18.7

Intersection LOS: B

Intersection Capacity Utilization 47.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: DIAMOND & E LAKESHORE/MISSION TRAIL

			
Ø1	Ø2	Ø3	Ø4
13 s	38.6 s	9.6 s	43.8 s
			
Ø5	Ø6	Ø7	Ø8
14.8 s	36.8 s	15.4 s	38 s

HCM 6th Signalized Intersection Summary

2: DIAMOND & E LAKESHORE/MISSION TRAIL

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	161	47	21	173	231	33	191	10	264	175	113
Future Volume (veh/h)	108	161	47	21	173	231	33	191	10	264	175	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	123	183	53	24	197	262	38	217	11	300	199	128
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	789	222	50	804	359	72	925	46	425	568	348
Arrive On Green	0.09	0.29	0.29	0.03	0.23	0.23	0.04	0.19	0.19	0.12	0.27	0.27
Sat Flow, veh/h	1781	2738	771	1781	3554	1585	1781	4980	249	3456	2116	1298
Grp Volume(v), veh/h	123	117	119	24	197	262	38	148	80	300	166	161
Grp Sat Flow(s),veh/h/ln	1781	1777	1732	1781	1777	1585	1781	1702	1825	1728	1777	1637
Q Serve(g_s), s	3.6	2.7	2.8	0.7	2.4	8.3	1.1	2.0	2.0	4.5	4.0	4.3
Cycle Q Clear(g_c), s	3.6	2.7	2.8	0.7	2.4	8.3	1.1	2.0	2.0	4.5	4.0	4.3
Prop In Lane	1.00		0.45	1.00		1.00	1.00		0.14	1.00		0.79
Lane Grp Cap(c), veh/h	160	512	499	50	804	359	72	632	339	425	477	439
V/C Ratio(X)	0.77	0.23	0.24	0.48	0.25	0.73	0.53	0.23	0.24	0.71	0.35	0.37
Avail Cap(c_a), veh/h	357	1254	1222	165	2125	948	337	2112	1132	539	1043	961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.0	14.6	14.7	25.8	17.1	19.3	25.3	18.7	18.7	22.7	15.9	16.0
Incr Delay (d2), s/veh	7.5	0.2	0.2	7.0	0.2	2.9	5.9	0.2	0.4	3.0	0.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	1.0	1.0	0.4	0.8	2.8	0.6	0.7	0.8	1.8	1.5	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	14.8	14.9	32.8	17.2	22.2	31.3	18.8	19.0	25.7	16.3	16.5
LnGrp LOS	C	B	B	C	B	C	C	B	B	C	B	B
Approach Vol, veh/h		359			483			266			627	
Approach Delay, s/veh		20.6			20.7			20.7			20.9	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.2	15.2	6.1	21.3	6.8	19.7	9.4	18.0				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.8	4.6	5.2	4.6	5.8				
Max Green Setting (Gmax), s	8.4	33.4	5.0	38.0	10.2	31.6	10.8	32.2				
Max Q Clear Time (g_c+I1), s	6.5	4.0	2.7	4.8	3.1	6.3	5.6	10.3				
Green Ext Time (p_c), s	0.2	1.4	0.0	1.4	0.0	1.9	0.1	1.9				
Intersection Summary												
HCM 6th Ctrl Delay			20.7									
HCM 6th LOS			C									

Timings

3: DIAMOND & AUTO CENTER/CASINO

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	112	32	5	23	41	458	105	498
Future Volume (vph)	112	32	5	23	41	458	105	498
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	38.2	38.2	36.2	36.2	9.6	30.2	9.6	29.2
Total Split (s)	48.0	48.0	48.0	48.0	18.0	49.0	23.0	54.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	15.0%	40.8%	19.2%	45.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	4.6	5.2	4.6	5.2
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	12.1	12.1	12.1	12.1	7.3	19.4	7.7	24.4
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.16	0.43	0.17	0.54
v/c Ratio	0.34	0.09	0.01	0.09	0.15	0.23	0.19	0.33
Control Delay	19.9	9.2	16.4	8.5	21.8	12.8	20.6	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	9.2	16.4	8.5	21.8	12.8	20.6	10.7
LOS	B	A	B	A	C	B	C	B
Approach Delay		15.4		8.9		13.5		12.2
Approach LOS		B		A		B		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 44.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 12.9

Intersection LOS: B

Intersection Capacity Utilization 46.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: DIAMOND & AUTO CENTER/CASINO



HCM 6th Signalized Intersection Summary

3: DIAMOND & AUTO CENTER/CASINO

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	112	32	48	5	23	50	41	458	16	105	498	92
Future Volume (veh/h)	112	32	48	5	23	50	41	458	16	105	498	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	119	34	51	5	24	53	44	487	17	112	530	98
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	483	442	394	482	442	394	87	1360	47	314	931	171
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.05	0.27	0.27	0.09	0.31	0.31
Sat Flow, veh/h	1322	1777	1585	1313	1777	1585	1781	5067	176	3456	2996	552
Grp Volume(v), veh/h	119	34	51	5	24	53	44	326	178	112	313	315
Grp Sat Flow(s),veh/h/ln	1322	1777	1585	1313	1777	1585	1781	1702	1839	1728	1777	1771
Q Serve(g_s), s	2.9	0.6	1.0	0.1	0.4	1.0	0.9	3.0	3.0	1.2	5.7	5.7
Cycle Q Clear(g_c), s	3.9	0.6	1.0	1.1	0.4	1.0	0.9	3.0	3.0	1.2	5.7	5.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.10	1.00		0.31
Lane Grp Cap(c), veh/h	483	442	394	482	442	394	87	914	494	314	552	550
V/C Ratio(X)	0.25	0.08	0.13	0.01	0.05	0.13	0.51	0.36	0.36	0.36	0.57	0.57
Avail Cap(c_a), veh/h	1632	1987	1772	1623	1987	1772	624	3895	2104	1661	2265	2258
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	11.0	11.2	11.6	10.9	11.2	17.8	11.3	11.3	16.3	11.0	11.1
Incr Delay (d2), s/veh	0.3	0.1	0.1	0.0	0.1	0.2	4.5	0.2	0.4	0.7	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.2	0.3	0.0	0.1	0.3	0.4	0.9	1.0	0.4	1.7	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.0	11.1	11.3	11.6	11.0	11.3	22.2	11.6	11.8	17.0	12.0	12.0
LnGrp LOS	B	B	B	B	B	B	C	B	B	B	B	B
Approach Vol, veh/h		204			82			548			740	
Approach Delay, s/veh		12.2			11.2			12.5			12.7	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	15.5		14.7	6.5	17.1		14.7				
Change Period (Y+Rc), s	4.6	5.2		5.2	4.6	5.2		5.2				
Max Green Setting (Gmax), s	18.4	43.8		42.8	13.4	48.8		42.8				
Max Q Clear Time (g_c+I1), s	3.2	6.0		5.9	3.9	7.7		3.1				
Green Ext Time (p_c), s	0.3	3.4		0.8	0.0	4.2		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				12.5								
HCM 6th LOS				B								

Timings

4: MISSION TRAIL & MALAGA

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	15	1	16	29	8	48	376	12	252
Future Volume (vph)	15	1	16	29	8	48	376	12	252
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	21.6	21.6	9.6	33.2	9.6	30.4	9.6	42.2
Total Split (s)	10.0	26.1	26.1	17.1	33.2	14.4	46.2	10.6	42.4
Total Split (%)	10.0%	26.1%	26.1%	17.1%	33.2%	14.4%	46.2%	10.6%	42.4%
Yellow Time (s)	3.6	4.2	4.2	3.6	4.2	3.6	5.4	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	5.2	4.6	5.2	4.6	6.4	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.3	11.6	11.6	7.9	11.9	7.9	29.2	6.6	26.7
Actuated g/C Ratio	0.16	0.30	0.30	0.21	0.31	0.21	0.76	0.17	0.70
v/c Ratio	0.06	0.00	0.03	0.09	0.03	0.15	0.18	0.05	0.12
Control Delay	21.3	19.0	0.1	18.0	10.1	18.1	7.4	20.8	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	19.0	0.1	18.0	10.1	18.1	7.4	20.8	10.7
LOS	C	B	A	B	B	B	A	C	B
Approach Delay		10.3			14.2		8.5		11.1
Approach LOS		B			B		A		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 38.3

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.18

Intersection Signal Delay: 9.9

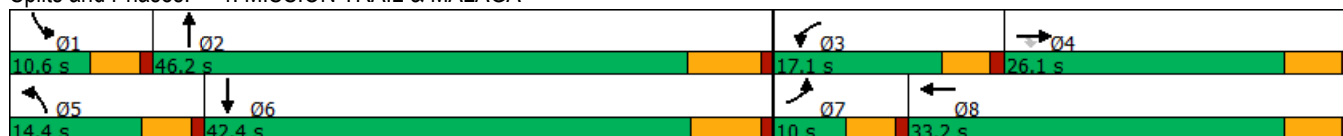
Intersection LOS: A

Intersection Capacity Utilization 37.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: MISSION TRAIL & MALAGA



HCM 6th Signalized Intersection Summary

4: MISSION TRAIL & MALAGA

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	1	16	29	8	20	48	376	35	12	252	5
Future Volume (veh/h)	15	1	16	29	8	20	48	376	35	12	252	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	1	19	34	9	23	56	437	41	14	293	6
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	254	215	70	273	243	103	949	89	32	887	18
Arrive On Green	0.02	0.14	0.14	0.04	0.15	0.15	0.06	0.29	0.29	0.02	0.25	0.25
Sat Flow, veh/h	1781	1870	1585	1781	1777	1585	1781	3285	307	1781	3561	73
Grp Volume(v), veh/h	17	1	19	34	9	23	56	236	242	14	146	153
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1777	1815	1781	1777	1857
Q Serve(g_s), s	0.4	0.0	0.4	0.8	0.2	0.5	1.2	4.4	4.4	0.3	2.7	2.7
Cycle Q Clear(g_c), s	0.4	0.0	0.4	0.8	0.2	0.5	1.2	4.4	4.4	0.3	2.7	2.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		0.04
Lane Grp Cap(c), veh/h	38	254	215	70	273	243	103	513	524	32	443	463
V/C Ratio(X)	0.44	0.00	0.09	0.49	0.03	0.09	0.54	0.46	0.46	0.44	0.33	0.33
Avail Cap(c_a), veh/h	240	974	825	555	1239	1105	435	1761	1799	266	1602	1674
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	15.0	15.2	18.9	14.5	14.6	18.4	11.7	11.7	19.5	12.3	12.3
Incr Delay (d2), s/veh	7.9	0.0	0.2	5.1	0.0	0.2	4.4	0.6	0.6	9.1	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.1	0.4	0.1	0.2	0.6	1.5	1.5	0.2	0.8	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.3	15.0	15.4	24.0	14.5	14.8	22.8	12.3	12.4	28.6	12.8	12.8
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h	37			66			534			313		
Approach Delay, s/veh	20.8			19.5			13.4			13.5		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.3	18.0	6.2	10.7	6.9	16.4	5.5	11.4				
Change Period (Y+Rc), s	4.6	6.4	4.6	5.2	4.6	* 6.4	4.6	5.2				
Max Green Setting (Gmax), s	6.0	39.8	12.5	20.9	9.8	* 36	5.4	28.0				
Max Q Clear Time (g_c+I1), s	2.3	6.4	2.8	2.4	3.2	4.7	2.4	2.5				
Green Ext Time (p_c), s	0.0	3.1	0.0	0.0	0.0	1.6	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			14.2									
HCM 6th LOS			B									
Notes												

Timings

5: DIAMOND & MALAGA

									
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT	SBR	Ø5
Lane Configurations									
Traffic Volume (vph)	18	7	30	7	185	6	114	17	
Future Volume (vph)	18	7	30	7	185	6	114	17	
Turn Type	Prot	NA	Prot	NA	NA	Prot	NA	Perm	
Protected Phases	7	4	3	8	2	1	6		5
Permitted Phases								6	
Detector Phase	7	4	3	8	2	1	6	6	
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0
Minimum Split (s)	9.6	35.2	9.6	42.2	35.2	9.6	36.2	36.2	9.6
Total Split (s)	10.0	37.2	15.0	42.2	37.8	10.0	37.8	37.8	10.0
Total Split (%)	10.0%	37.2%	15.0%	42.2%	37.8%	10.0%	37.8%	37.8%	10%
Yellow Time (s)	3.6	4.2	3.6	4.2	4.2	3.6	4.2	4.2	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.2	4.6	5.2	5.2	4.6	5.2	5.2	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min	Min	None
Act Effct Green (s)	6.0	11.1	6.8	11.4	27.4	6.0	28.6	28.6	
Actuated g/C Ratio	0.18	0.34	0.21	0.35	0.84	0.18	0.88	0.88	
v/c Ratio	0.06	0.01	0.09	0.02	0.08	0.02	0.04	0.01	
Control Delay	15.2	10.3	13.8	7.4	6.5	15.3	4.3	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.2	10.3	13.8	7.4	6.5	15.3	4.3	0.0	
LOS	B	B	B	A	A	B	A	A	
Approach Delay		13.5		11.2	6.5		4.2		
Approach LOS		B		B	A		A		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 32.6

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.09

Intersection Signal Delay: 6.8

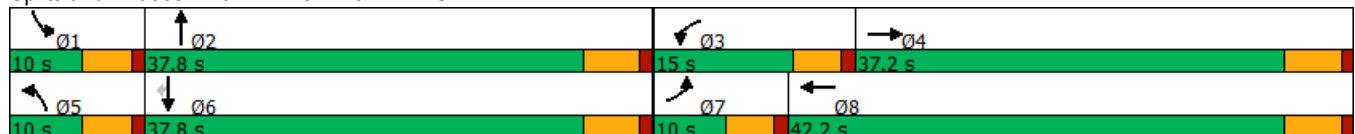
Intersection LOS: A

Intersection Capacity Utilization 25.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: DIAMOND & MALAGA



HCM 6th Signalized Intersection Summary

5: DIAMOND & MALAGA

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	7	3	30	7	14	0	185	18	6	114	17
Future Volume (veh/h)	18	7	3	30	7	14	0	185	18	6	114	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	8	3	34	8	16	0	213	21	7	131	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	322	113	71	246	220	5	912	89	17	1481	660
Arrive On Green	0.03	0.12	0.12	0.04	0.14	0.14	0.00	0.28	0.28	0.01	0.42	0.42
Sat Flow, veh/h	1781	2575	909	1781	1777	1585	1781	3270	319	1781	3554	1585
Grp Volume(v), veh/h	21	5	6	34	8	16	0	115	119	7	131	20
Grp Sat Flow(s),veh/h/ln	1781	1777	1707	1781	1777	1585	1781	1777	1813	1781	1777	1585
Q Serve(g_s), s	0.4	0.1	0.1	0.7	0.1	0.3	0.0	1.8	1.8	0.1	0.8	0.3
Cycle Q Clear(g_c), s	0.4	0.1	0.1	0.7	0.1	0.3	0.0	1.8	1.8	0.1	0.8	0.3
Prop In Lane	1.00		0.53	1.00		1.00	1.00		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	47	222	213	71	246	220	5	496	506	17	1481	660
V/C Ratio(X)	0.45	0.02	0.03	0.48	0.03	0.07	0.00	0.23	0.24	0.42	0.09	0.03
Avail Cap(c_a), veh/h	268	1586	1524	517	1834	1636	268	1616	1649	268	3232	1441
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	13.8	13.8	16.8	13.4	13.4	0.0	10.0	10.0	17.7	6.3	6.2
Incr Delay (d2), s/veh	6.6	0.0	0.0	4.9	0.1	0.1	0.0	0.2	0.2	15.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.3	0.0	0.1	0.0	0.5	0.6	0.1	0.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.8	13.8	13.8	21.7	13.4	13.6	0.0	10.2	10.2	33.4	6.4	6.2
LnGrp LOS	C	B	B	C	B	B	A	B	B	C	A	A
Approach Vol, veh/h	32			58			234			158		
Approach Delay, s/veh	20.3			18.3			10.2			7.5		
Approach LOS	C			B			B			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.9	15.2	6.0	9.7	0.0	20.1	5.5	10.2				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2				
Max Green Setting (Gmax), s	5.4	32.6	10.4	32.0	5.4	32.6	5.4	37.0				
Max Q Clear Time (g_c+I1), s	2.1	3.8	2.7	2.1	0.0	2.8	2.4	2.3				
Green Ext Time (p_c), s	0.0	1.3	0.0	0.0	0.0	0.9	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	11.0											
HCM 6th LOS	B											

Timings

2: DIAMOND & E LAKESHORE/MISSION TRAIL

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	321	35	332	321	115	200	342	211
Future Volume (vph)	156	321	35	332	321	115	200	342	211
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4	3	8		5	2	1	6
Permitted Phases					8				
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	43.8	9.6	37.8	37.8	9.6	38.2	9.6	33.2
Total Split (s)	15.4	43.8	9.6	38.0	38.0	14.8	38.6	13.0	36.8
Total Split (%)	14.7%	41.7%	9.1%	36.2%	36.2%	14.1%	36.8%	12.4%	35.0%
Yellow Time (s)	3.6	4.8	3.6	4.8	4.8	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	5.8	4.6	5.2	4.6	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	10.6	24.8	5.0	13.1	13.1	9.3	12.4	8.5	11.5
Actuated g/C Ratio	0.16	0.38	0.08	0.20	0.20	0.14	0.19	0.13	0.18
v/c Ratio	0.56	0.32	0.26	0.48	0.57	0.47	0.23	0.79	0.55
Control Delay	35.2	15.0	35.7	25.5	7.3	33.6	21.8	43.8	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	15.0	35.7	25.5	7.3	33.6	21.8	43.8	16.3
LOS	D	B	D	C	A	C	C	D	B
Approach Delay		20.6		17.6			25.9		29.1
Approach LOS		C		B			C		C

Intersection Summary

Cycle Length: 105

Actuated Cycle Length: 64.9

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.1

Intersection LOS: C

Intersection Capacity Utilization 52.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: DIAMOND & E LAKESHORE/MISSION TRAIL

			
Ø1	Ø2	Ø3	Ø4
13 s	38.6 s	9.6 s	43.8 s
			
Ø5	Ø6	Ø7	Ø8
14.8 s	36.8 s	15.4 s	38 s

HCM 6th Signalized Intersection Summary

2: DIAMOND & E LAKESHORE/MISSION TRAIL

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	321	87	35	332	321	115	200	17	342	211	183
Future Volume (veh/h)	156	321	87	35	332	321	115	200	17	342	211	183
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	161	331	90	36	342	331	119	206	18	353	218	189
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	204	967	259	66	965	431	154	766	66	453	378	312
Arrive On Green	0.11	0.35	0.35	0.04	0.27	0.27	0.09	0.16	0.16	0.13	0.20	0.20
Sat Flow, veh/h	1781	2771	742	1781	3554	1585	1781	4790	410	3456	1847	1525
Grp Volume(v), veh/h	161	210	211	36	342	331	119	145	79	353	209	198
Grp Sat Flow(s),veh/h/ln	1781	1777	1737	1781	1777	1585	1781	1702	1797	1728	1777	1596
Q Serve(g_s), s	5.5	5.5	5.6	1.2	4.9	12.0	4.1	2.3	2.4	6.2	6.6	7.0
Cycle Q Clear(g_c), s	5.5	5.5	5.6	1.2	4.9	12.0	4.1	2.3	2.4	6.2	6.6	7.0
Prop In Lane	1.00		0.43	1.00		1.00	1.00		0.23	1.00		0.96
Lane Grp Cap(c), veh/h	204	620	606	66	965	431	154	544	287	453	364	326
V/C Ratio(X)	0.79	0.34	0.35	0.54	0.35	0.77	0.77	0.27	0.27	0.78	0.58	0.61
Avail Cap(c_a), veh/h	308	1079	1055	142	1829	816	290	1818	959	464	898	806
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	15.0	15.1	29.6	18.4	21.0	28.0	23.1	23.1	26.3	22.4	22.6
Incr Delay (d2), s/veh	7.7	0.3	0.3	6.8	0.2	2.9	8.0	0.3	0.5	8.1	1.4	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.1	2.1	0.6	1.7	4.1	2.0	0.9	1.0	2.9	2.7	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	15.4	15.4	36.4	18.6	23.9	36.0	23.3	23.6	34.4	23.9	24.4
LnGrp LOS	C	B	B	D	B	C	D	C	C	C	C	C
Approach Vol, veh/h		582			709			343			760	
Approach Delay, s/veh		20.7			22.0			27.8			28.9	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	15.2	6.9	27.6	10.0	18.0	11.8	22.8				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.8	4.6	5.2	4.6	5.8				
Max Green Setting (Gmax), s	8.4	33.4	5.0	38.0	10.2	31.6	10.8	32.2				
Max Q Clear Time (g_c+I1), s	8.2	4.4	3.2	7.6	6.1	9.0	7.5	14.0				
Green Ext Time (p_c), s	0.0	1.3	0.0	2.7	0.1	2.4	0.1	3.0				
Intersection Summary												
HCM 6th Ctrl Delay			24.7									
HCM 6th LOS			C									

Timings

3: DIAMOND & AUTO CENTER/CASINO

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	97	148	36	70	87	588	142	515
Future Volume (vph)	97	148	36	70	87	588	142	515
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	38.2	38.2	36.2	36.2	9.6	30.2	9.6	29.2
Total Split (s)	48.0	48.0	48.0	48.0	18.0	49.0	23.0	54.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	15.0%	40.8%	19.2%	45.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	4.6	5.2	4.6	5.2
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	12.1	12.1	12.1	12.1	8.6	16.1	8.2	15.6
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.18	0.33	0.17	0.32
v/c Ratio	0.35	0.30	0.14	0.24	0.29	0.38	0.25	0.55
Control Delay	22.4	11.0	19.2	7.9	23.3	13.9	22.2	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	11.0	19.2	7.9	23.3	13.9	22.2	16.5
LOS	C	B	B	A	C	B	C	B
Approach Delay		14.0		9.6		15.1		17.6
Approach LOS		B		A		B		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 48.9

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 55.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: DIAMOND & AUTO CENTER/CASINO



HCM 6th Signalized Intersection Summary

3: DIAMOND & AUTO CENTER/CASINO

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	148	124	36	70	142	87	588	33	142	515	88
Future Volume (veh/h)	97	148	124	36	70	142	87	588	33	142	515	88
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	151	127	37	71	145	89	600	34	145	526	90
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	383	478	374	377	448	399	141	1387	78	342	912	155
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.08	0.28	0.28	0.10	0.30	0.30
Sat Flow, veh/h	1165	1895	1485	1101	1777	1585	1781	4946	279	3456	3037	518
Grp Volume(v), veh/h	99	141	137	37	71	145	89	412	222	145	307	309
Grp Sat Flow(s),veh/h/ln	1165	1777	1603	1101	1777	1585	1781	1702	1820	1728	1777	1777
Q Serve(g_s), s	3.1	2.6	2.8	1.2	1.3	3.1	2.0	4.0	4.1	1.6	5.9	6.0
Cycle Q Clear(g_c), s	6.2	2.6	2.8	4.0	1.3	3.1	2.0	4.0	4.1	1.6	5.9	6.0
Prop In Lane	1.00		0.93	1.00		1.00	1.00		0.15	1.00		0.29
Lane Grp Cap(c), veh/h	383	448	404	377	448	399	141	955	510	342	534	534
V/C Ratio(X)	0.26	0.31	0.34	0.10	0.16	0.36	0.63	0.43	0.44	0.42	0.58	0.58
Avail Cap(c_a), veh/h	1315	1869	1686	1258	1869	1667	587	3664	1959	1562	2131	2131
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	12.4	12.5	14.1	11.9	12.5	18.2	12.0	12.0	17.2	12.0	12.1
Incr Delay (d2), s/veh	0.4	0.4	0.5	0.1	0.2	0.6	4.6	0.3	0.6	0.8	1.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.9	0.9	0.2	0.4	0.9	0.9	1.2	1.4	0.6	1.9	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	12.8	12.9	14.2	12.0	13.1	22.8	12.3	12.6	18.1	13.0	13.1
LnGrp LOS	B	B	B	B	B	B	C	B	B	B	B	B
Approach Vol, veh/h		377			253			723			761	
Approach Delay, s/veh		13.5			13.0			13.7			14.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	16.6		15.5	7.8	17.4		15.5				
Change Period (Y+Rc), s	4.6	5.2		5.2	4.6	5.2		5.2				
Max Green Setting (Gmax), s	18.4	43.8		42.8	13.4	48.8		42.8				
Max Q Clear Time (g_c+I1), s	3.6	7.0		8.2	5.0	8.0		6.0				
Green Ext Time (p_c), s	0.4	4.4		2.1	0.1	4.1		1.5				
Intersection Summary												
HCM 6th Ctrl Delay				13.7								
HCM 6th LOS				B								

Timings

4: MISSION TRAIL & MALAGA

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	23	3	52	89	16	62	536	18	635
Future Volume (vph)	23	3	52	89	16	62	536	18	635
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	21.6	21.6	9.6	33.2	9.6	30.4	9.6	42.2
Total Split (s)	10.0	26.1	26.1	17.1	33.2	14.4	46.2	10.6	42.4
Total Split (%)	10.0%	26.1%	26.1%	17.1%	33.2%	14.4%	46.2%	10.6%	42.4%
Yellow Time (s)	3.6	4.2	4.2	3.6	4.2	3.6	5.4	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	5.2	4.6	5.2	4.6	6.4	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.2	11.4	11.4	10.4	15.7	8.4	32.0	6.6	27.2
Actuated g/C Ratio	0.11	0.20	0.20	0.18	0.27	0.15	0.56	0.11	0.47
v/c Ratio	0.13	0.01	0.12	0.29	0.04	0.25	0.32	0.09	0.41
Control Delay	34.5	28.7	0.5	29.5	14.7	31.3	12.2	33.4	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	28.7	0.5	29.5	14.7	31.3	12.2	33.4	18.1
LOS	C	C	A	C	B	C	B	C	B
Approach Delay		11.6			25.2		14.0		18.5
Approach LOS		B			C		B		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 57.6

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 16.8

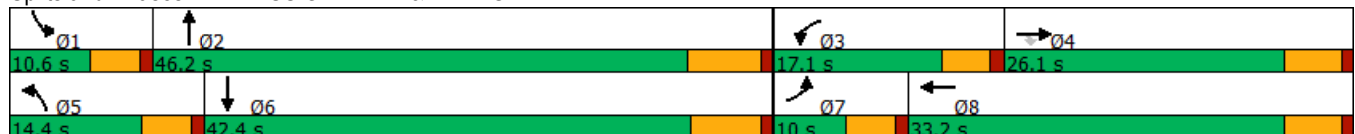
Intersection LOS: B

Intersection Capacity Utilization 47.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: MISSION TRAIL & MALAGA



HCM 6th Signalized Intersection Summary

4: MISSION TRAIL & MALAGA

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	3	52	89	16	20	62	536	63	18	635	17
Future Volume (veh/h)	23	3	52	89	16	20	62	536	63	18	635	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	3	54	93	17	21	65	558	66	19	661	18
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	51	305	258	130	368	329	106	1025	121	41	1003	27
Arrive On Green	0.03	0.16	0.16	0.07	0.21	0.21	0.06	0.32	0.32	0.02	0.28	0.28
Sat Flow, veh/h	1781	1870	1585	1781	1777	1585	1781	3202	378	1781	3534	96
Grp Volume(v), veh/h	24	3	54	93	17	21	65	309	315	19	332	347
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1777	1802	1781	1777	1853
Q Serve(g_s), s	0.7	0.1	1.5	2.5	0.4	0.5	1.8	7.1	7.1	0.5	8.1	8.2
Cycle Q Clear(g_c), s	0.7	0.1	1.5	2.5	0.4	0.5	1.8	7.1	7.1	0.5	8.1	8.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.21	1.00		0.05
Lane Grp Cap(c), veh/h	51	305	258	130	368	329	106	569	577	41	504	526
V/C Ratio(X)	0.47	0.01	0.21	0.72	0.05	0.06	0.61	0.54	0.55	0.46	0.66	0.66
Avail Cap(c_a), veh/h	195	791	670	450	1006	898	353	1431	1451	216	1301	1357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.7	17.4	17.9	22.4	15.7	15.7	22.7	13.8	13.8	23.8	15.6	15.6
Incr Delay (d2), s/veh	6.7	0.0	0.4	7.1	0.1	0.1	5.6	0.8	0.8	7.7	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.5	1.2	0.1	0.2	0.8	2.5	2.6	0.3	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	17.4	18.3	29.6	15.7	15.8	28.2	14.6	14.6	31.6	17.1	17.0
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h	81			131			689			698		
Approach Delay, s/veh	21.9			25.6			15.9			17.4		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	22.2	8.2	13.2	7.6	20.4	6.0	15.5				
Change Period (Y+Rc), s	4.6	6.4	4.6	5.2	4.6	* 6.4	4.6	5.2				
Max Green Setting (Gmax), s	6.0	39.8	12.5	20.9	9.8	* 36	5.4	28.0				
Max Q Clear Time (g_c+I1), s	2.5	9.1	4.5	3.5	3.8	10.2	2.7	2.5				
Green Ext Time (p_c), s	0.0	4.2	0.1	0.1	0.1	3.9	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	17.7											
HCM 6th LOS	B											
Notes												

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

Timings

5: DIAMOND & MALAGA

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	13	6	57	1	1	220	27	239	1
Future Volume (vph)	13	6	57	1	1	220	27	239	1
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4	3	8	5	2	1	6	
Permitted Phases									6
Detector Phase	7	4	3	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	35.2	9.6	42.2	9.6	35.2	9.6	36.2	36.2
Total Split (s)	10.0	37.2	15.0	42.2	10.0	37.8	10.0	37.8	37.8
Total Split (%)	10.0%	37.2%	15.0%	42.2%	10.0%	37.8%	10.0%	37.8%	37.8%
Yellow Time (s)	3.6	4.2	3.6	4.2	3.6	4.2	3.6	4.2	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Act Effct Green (s)	6.0	11.1	8.2	11.6	6.0	23.6	6.0	23.6	23.6
Actuated g/C Ratio	0.18	0.33	0.25	0.35	0.18	0.71	0.18	0.71	0.71
v/c Ratio	0.04	0.01	0.14	0.03	0.00	0.11	0.09	0.10	0.00
Control Delay	16.9	12.2	13.5	0.0	18.0	8.4	16.9	8.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	12.2	13.5	0.0	18.0	8.4	16.9	8.8	0.0
LOS	B	B	B	A	B	A	B	A	A
Approach Delay		15.1		8.3		8.4		9.6	
Approach LOS		B		A		A		A	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 33.4

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.14

Intersection Signal Delay: 9.1

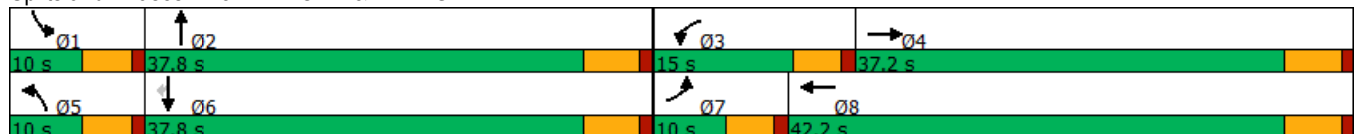
Intersection LOS: A

Intersection Capacity Utilization 34.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: DIAMOND & MALAGA



HCM 6th Signalized Intersection Summary 5: DIAMOND & MALAGA

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	6	2	57	1	35	1	220	34	27	239	1
Future Volume (veh/h)	13	6	2	57	1	35	1	220	34	27	239	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	7	2	62	1	38	1	239	37	29	260	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	32	372	101	112	319	285	5	802	122	62	1040	464
Arrive On Green	0.02	0.13	0.13	0.06	0.18	0.18	0.00	0.26	0.26	0.03	0.29	0.29
Sat Flow, veh/h	1781	2759	752	1781	1777	1585	1781	3090	472	1781	3554	1585
Grp Volume(v), veh/h	14	4	5	62	1	38	1	136	140	29	260	1
Grp Sat Flow(s),veh/h/ln	1781	1777	1735	1781	1777	1585	1781	1777	1785	1781	1777	1585
Q Serve(g_s), s	0.3	0.1	0.1	1.3	0.0	0.8	0.0	2.4	2.4	0.6	2.2	0.0
Cycle Q Clear(g_c), s	0.3	0.1	0.1	1.3	0.0	0.8	0.0	2.4	2.4	0.6	2.2	0.0
Prop In Lane	1.00		0.43	1.00		1.00	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	32	239	234	112	319	285	5	461	463	62	1040	464
V/C Ratio(X)	0.44	0.02	0.02	0.55	0.00	0.13	0.22	0.30	0.30	0.47	0.25	0.00
Avail Cap(c_a), veh/h	250	1475	1440	481	1705	1521	250	1503	1510	250	3005	1340
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	14.5	14.5	17.5	13.0	13.3	19.2	11.4	11.5	18.3	10.4	9.7
Incr Delay (d2), s/veh	9.0	0.0	0.0	4.2	0.0	0.2	21.9	0.4	0.4	5.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.2	0.0	0.8	0.8	0.3	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	14.5	14.5	21.7	13.0	13.5	41.1	11.8	11.8	23.7	10.5	9.7
LnGrp LOS	C	B	B	C	B	B	D	B	B	C	B	A
Approach Vol, veh/h	23			101			277			290		
Approach Delay, s/veh	22.6			18.6			11.9			11.8		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	15.2	7.0	10.4	4.7	16.5	5.3	12.1				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2				
Max Green Setting (Gmax), s	5.4	32.6	10.4	32.0	5.4	32.6	5.4	37.0				
Max Q Clear Time (g_c+I1), s	2.6	4.4	3.3	2.1	2.0	4.2	2.3	2.8				
Green Ext Time (p_c), s	0.0	1.6	0.1	0.0	0.0	1.7	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay	13.2											
HCM 6th LOS	B											

APPENDIX D. EAP CONDITION LOS ANALYSIS REPORTS

HCM 6th TWSC

1: MISSION TRAIL & ACCESS

04/07/2021

Intersection						
Int Delay, s/veh	6.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↕↕		↕	↕↕
Traffic Vol, veh/h	0	0	421	0	0	249
Future Vol, veh/h	136	135	337	136	136	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	148	147	366	148	148	179
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	826	257	0	0	514	0
Stage 1	440	-	-	-	-	-
Stage 2	386	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	310	742	-	-	1048	-
Stage 1	616	-	-	-	-	-
Stage 2	656	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	266	742	-	-	1048	-
Mov Cap-2 Maneuver	390	-	-	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	564	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	21.2	0		4.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	511	1048	-	
HCM Lane V/C Ratio	-	-	0.576	0.141	-	
HCM Control Delay (s)	-	-	21.2	9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	3.6	0.5	-	

Timings

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/07/2021

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	112	168	22	180	240	34	199	275	182
Future Volume (vph)	112	189	22	201	270	34	199	306	182
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4	3	8		5	2	1	6
Permitted Phases					8				
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	43.8	9.6	37.8	37.8	9.6	38.2	9.6	33.2
Total Split (s)	15.4	43.8	9.6	38.0	38.0	14.8	38.6	13.0	36.8
Total Split (%)	14.7%	41.7%	9.1%	36.2%	36.2%	14.1%	36.8%	12.4%	35.0%
Yellow Time (s)	3.6	4.8	3.6	4.8	4.8	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	5.8	4.6	5.2	4.6	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	9.4	23.3	5.0	11.0	11.0	6.8	10.6	8.4	18.9
Actuated g/C Ratio	0.16	0.39	0.08	0.18	0.18	0.11	0.18	0.14	0.32
v/c Ratio	0.46	0.20	0.17	0.35	0.57	0.19	0.26	0.72	0.30
Control Delay	29.1	11.8	30.0	23.3	7.8	27.2	21.9	35.9	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	11.8	30.0	23.3	7.8	27.2	21.9	35.9	12.3
LOS	C	B	C	C	A	C	C	D	B
Approach Delay		17.3		15.1			22.7		24.2
Approach LOS		B		B			C		C

Intersection Summary

Cycle Length: 105

Actuated Cycle Length: 59.7

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 19.9

Intersection LOS: B

Intersection Capacity Utilization 47.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: DIAMOND & E LAKESHORE/MISSION TRAIL

			
Ø1	Ø2	Ø3	Ø4
13 s	38.6 s	9.6 s	43.8 s
			
Ø5	Ø6	Ø7	Ø8
14.8 s	36.8 s	15.4 s	38 s

HCM 6th Signalized Intersection Summary

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	112	168	49	22	180	240	34	199	10	275	182	118
Future Volume (veh/h)	112	189	49	22	201	270	34	199	10	306	182	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	215	56	25	228	307	39	226	11	348	207	134
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	165	888	226	51	898	401	72	862	42	460	560	346
Arrive On Green	0.09	0.32	0.32	0.03	0.25	0.25	0.04	0.17	0.17	0.13	0.27	0.27
Sat Flow, veh/h	1781	2805	714	1781	3554	1585	1781	4991	240	3456	2108	1304
Grp Volume(v), veh/h	127	134	137	25	228	307	39	153	84	348	173	168
Grp Sat Flow(s),veh/h/ln	1781	1777	1742	1781	1777	1585	1781	1702	1827	1728	1777	1636
Q Serve(g_s), s	4.0	3.2	3.4	0.8	3.0	10.4	1.2	2.3	2.3	5.6	4.6	4.9
Cycle Q Clear(g_c), s	4.0	3.2	3.4	0.8	3.0	10.4	1.2	2.3	2.3	5.6	4.6	4.9
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.13	1.00		0.80
Lane Grp Cap(c), veh/h	165	563	551	51	898	401	72	588	316	460	472	434
V/C Ratio(X)	0.77	0.24	0.25	0.49	0.25	0.77	0.54	0.26	0.27	0.76	0.37	0.39
Avail Cap(c_a), veh/h	332	1166	1143	154	1977	882	314	1964	1054	501	970	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.7	14.6	14.7	27.7	17.3	20.0	27.3	20.7	20.8	24.2	17.3	17.4
Incr Delay (d2), s/veh	7.4	0.2	0.2	7.1	0.1	3.1	6.3	0.2	0.4	6.0	0.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	1.2	1.2	0.4	1.0	3.6	0.6	0.8	0.9	2.5	1.7	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.1	14.8	14.9	34.8	17.4	23.1	33.5	21.0	21.2	30.2	17.8	18.0
LnGrp LOS	C	B	B	C	B	C	C	C	C	C	B	B
Approach Vol, veh/h	398			560			276			689		
Approach Delay, s/veh	20.7			21.3			22.8			24.1		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.3	15.2	6.3	24.1	6.9	20.6	10.0	20.4				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.8	4.6	5.2	4.6	5.8				
Max Green Setting (Gmax), s	8.4	33.4	5.0	38.0	10.2	31.6	10.8	32.2				
Max Q Clear Time (g_c+I1), s	7.6	4.3	2.8	5.4	3.2	6.9	6.0	12.4				
Green Ext Time (p_c), s	0.1	1.4	0.0	1.7	0.0	2.0	0.1	2.2				
Intersection Summary												
HCM 6th Ctrl Delay	22.4											
HCM 6th LOS	C											

Timings

3: DIAMOND & AUTO CENTER/CASINO

04/07/2021

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	117	33	5	24	43	477	109	518
Future Volume (vph)	117	33	10	24	53	492	109	534
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	38.2	38.2	36.2	36.2	9.6	30.2	9.6	29.2
Total Split (s)	48.0	48.0	48.0	48.0	18.0	49.0	23.0	54.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	15.0%	40.8%	19.2%	45.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	4.6	5.2	4.6	5.2
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	12.2	12.2	12.2	12.2	7.5	16.6	7.7	19.2
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.15	0.34	0.16	0.39
v/c Ratio	0.38	0.12	0.03	0.10	0.21	0.32	0.22	0.49
Control Delay	22.3	9.2	17.9	9.1	23.9	13.4	22.6	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	9.2	17.9	9.1	23.9	13.4	22.6	14.0
LOS	C	A	B	A	C	B	C	B
Approach Delay		16.5		10.2		14.4		15.3
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 49.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.8

Intersection LOS: B

Intersection Capacity Utilization 47.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: DIAMOND & AUTO CENTER/CASINO



HCM 6th Signalized Intersection Summary

3: DIAMOND & AUTO CENTER/CASINO

04/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	33	50	5	24	52	43	477	17	109	518	96
Future Volume (veh/h)	117	33	60	10	24	52	53	492	22	109	534	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	124	35	64	11	26	55	56	523	23	116	568	102
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	465	432	386	455	432	386	103	1451	63	314	970	174
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.06	0.29	0.29	0.09	0.32	0.32
Sat Flow, veh/h	1317	1777	1585	1296	1777	1585	1781	5016	219	3456	3011	539
Grp Volume(v), veh/h	124	35	64	11	26	55	56	354	192	116	334	336
Grp Sat Flow(s),veh/h/ln	1317	1777	1585	1296	1777	1585	1781	1702	1831	1728	1777	1773
Q Serve(g_s), s	3.2	0.6	1.3	0.3	0.4	1.1	1.2	3.3	3.3	1.3	6.3	6.3
Cycle Q Clear(g_c), s	4.3	0.6	1.3	1.5	0.4	1.1	1.2	3.3	3.3	1.3	6.3	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.30
Lane Grp Cap(c), veh/h	465	432	386	455	432	386	103	985	530	314	572	571
V/C Ratio(X)	0.27	0.08	0.17	0.02	0.06	0.14	0.54	0.36	0.36	0.37	0.58	0.59
Avail Cap(c_a), veh/h	1560	1909	1703	1532	1909	1703	599	3743	2013	1596	2177	2172
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.5	11.6	11.9	12.5	11.6	11.8	18.2	11.2	11.2	17.0	11.3	11.3
Incr Delay (d2), s/veh	0.3	0.1	0.2	0.0	0.1	0.2	4.4	0.2	0.4	0.7	1.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.2	0.4	0.1	0.1	0.3	0.5	1.0	1.1	0.4	2.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.8	11.7	12.1	12.5	11.6	12.0	22.6	11.4	11.7	17.8	12.2	12.3
LnGrp LOS	B	B	B	B	B	B	C	B	B	B	B	B
Approach Vol, veh/h	223			92			602			786		
Approach Delay, s/veh	13.0			11.9			12.6			13.1		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	16.7		14.9	6.9	18.0		14.9				
Change Period (Y+Rc), s	4.6	5.2		5.2	4.6	5.2		5.2				
Max Green Setting (Gmax), s	18.4	43.8		42.8	13.4	48.8		42.8				
Max Q Clear Time (g_c+I1), s	3.3	6.3		6.3	4.2	8.3		3.5				
Green Ext Time (p_c), s	0.3	3.7		1.0	0.1	4.5		0.5				
Intersection Summary												
HCM 6th Ctrl Delay	12.8											
HCM 6th LOS	B											

Timings

4: MISSION TRAIL & MALAGA

04/07/2021

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	16	1	17	30	8	50	391	12	262
Future Volume (vph)	42	1	17	30	8	50	417	12	288
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	21.6	21.6	9.6	33.2	9.6	30.4	9.6	42.2
Total Split (s)	10.0	26.1	26.1	17.1	33.2	14.4	46.2	10.6	42.4
Total Split (%)	10.0%	26.1%	26.1%	17.1%	33.2%	14.4%	46.2%	10.6%	42.4%
Yellow Time (s)	3.6	4.2	4.2	3.6	4.2	3.6	5.4	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	5.2	4.6	5.2	4.6	6.4	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.7	12.4	12.4	9.7	12.8	8.5	30.1	7.1	27.9
Actuated g/C Ratio	0.17	0.31	0.31	0.24	0.32	0.21	0.75	0.18	0.69
v/c Ratio	0.17	0.00	0.03	0.08	0.03	0.16	0.20	0.04	0.15
Control Delay	23.1	21.0	0.1	17.4	11.1	19.8	8.5	22.8	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	21.0	0.1	17.4	11.1	19.8	8.5	22.8	11.6
LOS	C	C	A	B	B	B	A	C	B
Approach Delay		16.5			14.3		9.6		12.0
Approach LOS		B			B		A		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 40.2

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.20

Intersection Signal Delay: 11.1

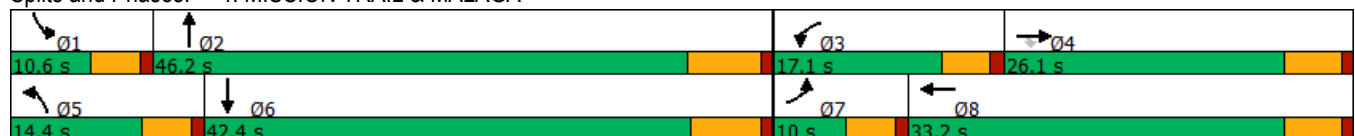
Intersection LOS: B

Intersection Capacity Utilization 38.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: MISSION TRAIL & MALAGA



HCM 6th Signalized Intersection Summary

4: MISSION TRAIL & MALAGA

04/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	1	17	30	8	21	50	391	36	12	262	5
Future Volume (veh/h)	42	1	17	30	8	21	50	417	36	12	288	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	1	20	35	9	24	58	485	42	14	335	36
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	92	312	264	71	275	245	104	924	80	32	773	82
Arrive On Green	0.05	0.17	0.17	0.04	0.15	0.15	0.06	0.28	0.28	0.02	0.24	0.24
Sat Flow, veh/h	1781	1870	1585	1781	1777	1585	1781	3310	286	1781	3239	346
Grp Volume(v), veh/h	49	1	20	35	9	24	58	260	267	14	183	188
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1777	1819	1781	1777	1808
Q Serve(g_s), s	1.1	0.0	0.4	0.8	0.2	0.5	1.3	5.2	5.2	0.3	3.7	3.7
Cycle Q Clear(g_c), s	1.1	0.0	0.4	0.8	0.2	0.5	1.3	5.2	5.2	0.3	3.7	3.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		0.19
Lane Grp Cap(c), veh/h	92	312	264	71	275	245	104	496	508	32	424	431
V/C Ratio(X)	0.53	0.00	0.08	0.49	0.03	0.10	0.56	0.52	0.53	0.44	0.43	0.44
Avail Cap(c_a), veh/h	229	933	790	531	1187	1059	416	1687	1727	255	1535	1562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	14.6	14.7	19.7	15.0	15.2	19.2	12.8	12.8	20.4	13.5	13.6
Incr Delay (d2), s/veh	4.7	0.0	0.1	5.2	0.0	0.2	4.6	0.9	0.8	9.2	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.1	0.4	0.1	0.2	0.6	1.8	1.8	0.2	1.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	14.6	14.9	24.9	15.1	15.4	23.8	13.6	13.6	29.5	14.2	14.3
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h	70			68			585			385		
Approach Delay, s/veh	21.3			20.2			14.6			14.8		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.4	18.1	6.3	12.2	7.1	16.4	6.8	11.7				
Change Period (Y+Rc), s	4.6	6.4	4.6	5.2	4.6	* 6.4	4.6	5.2				
Max Green Setting (Gmax), s	6.0	39.8	12.5	20.9	9.8	* 36	5.4	28.0				
Max Q Clear Time (g_c+I1), s	2.3	7.2	2.8	2.4	3.3	5.7	3.1	2.5				
Green Ext Time (p_c), s	0.0	3.5	0.0	0.0	0.0	2.0	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	15.4											
HCM 6th LOS	B											
Notes												

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

Timings

5: DIAMOND & MALAGA

04/07/2021

									
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT	SBR	Ø5
Lane Configurations									
Traffic Volume (vph)	19	7	31	7	192	6	119	18	
Future Volume (vph)	19	7	57	7	192	6	119	18	
Turn Type	Prot	NA	Prot	NA	NA	Prot	NA	Perm	
Protected Phases	7	4	3	8	2	1	6		5
Permitted Phases								6	
Detector Phase	7	4	3	8	2	1	6	6	
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0
Minimum Split (s)	9.6	35.2	9.6	42.2	35.2	9.6	36.2	36.2	9.6
Total Split (s)	10.0	37.2	15.0	42.2	37.8	10.0	37.8	37.8	10.0
Total Split (%)	10.0%	37.2%	15.0%	42.2%	37.8%	10.0%	37.8%	37.8%	10%
Yellow Time (s)	3.6	4.2	3.6	4.2	4.2	3.6	4.2	4.2	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.2	4.6	5.2	5.2	4.6	5.2	5.2	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min	Min	None
Act Effct Green (s)	6.3	11.8	7.8	12.2	26.2	6.3	27.3	27.3	
Actuated g/C Ratio	0.20	0.38	0.25	0.39	0.84	0.20	0.88	0.88	
v/c Ratio	0.06	0.01	0.15	0.02	0.09	0.02	0.04	0.01	
Control Delay	14.7	10.2	12.6	6.7	6.3	15.0	4.5	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.7	10.2	12.6	6.7	6.3	15.0	4.5	0.0	
LOS	B	B	B	A	A	B	A	A	
Approach Delay		13.2		10.9	6.3		4.3		
Approach LOS		B		B	A		A		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 31.2

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.15

Intersection Signal Delay: 6.9

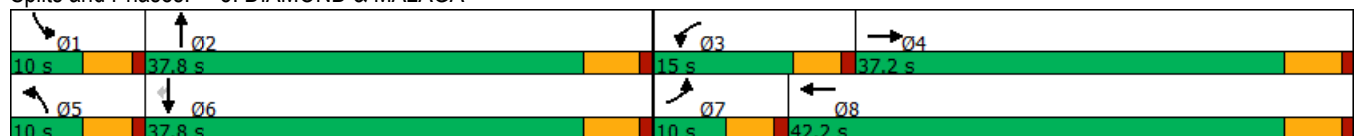
Intersection LOS: A

Intersection Capacity Utilization 25.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: DIAMOND & MALAGA



HCM 6th Signalized Intersection Summary

5: DIAMOND & MALAGA

04/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	7	3	31	7	15	0	192	19	6	119	18
Future Volume (veh/h)	19	7	3	57	7	15	0	192	45	6	119	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	8	3	66	8	17	0	221	52	7	137	21
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	49	349	123	118	310	277	5	764	176	17	1416	632
Arrive On Green	0.03	0.14	0.14	0.07	0.17	0.17	0.00	0.27	0.27	0.01	0.40	0.40
Sat Flow, veh/h	1781	2575	909	1781	1777	1585	1781	2867	661	1781	3554	1585
Grp Volume(v), veh/h	22	5	6	66	8	17	0	135	138	7	137	21
Grp Sat Flow(s),veh/h/ln	1781	1777	1707	1781	1777	1585	1781	1777	1751	1781	1777	1585
Q Serve(g_s), s	0.5	0.1	0.1	1.3	0.1	0.3	0.0	2.3	2.4	0.1	0.9	0.3
Cycle Q Clear(g_c), s	0.5	0.1	0.1	1.3	0.1	0.3	0.0	2.3	2.4	0.1	0.9	0.3
Prop In Lane	1.00		0.53	1.00		1.00	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	49	241	231	118	310	277	5	474	467	17	1416	632
V/C Ratio(X)	0.45	0.02	0.02	0.56	0.03	0.06	0.00	0.29	0.30	0.42	0.10	0.03
Avail Cap(c_a), veh/h	256	1515	1456	494	1752	1563	256	1544	1522	256	3087	1377
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	14.1	14.1	17.0	12.8	12.9	0.0	10.9	11.0	18.5	7.1	6.9
Incr Delay (d2), s/veh	6.4	0.0	0.0	4.1	0.0	0.1	0.0	0.3	0.3	15.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.1	0.0	0.7	0.7	0.1	0.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	14.1	14.1	21.1	12.9	13.0	0.0	11.3	11.3	34.3	7.1	6.9
LnGrp LOS	C	B	B	C	B	B	A	B	B	C	A	A
Approach Vol, veh/h	33			91			273			165		
Approach Delay, s/veh	21.0			18.9			11.3			8.2		
Approach LOS	C			B			B			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.0	15.2	7.1	10.3	0.0	20.2	5.6	11.7				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2				
Max Green Setting (Gmax), s	5.4	32.6	10.4	32.0	5.4	32.6	5.4	37.0				
Max Q Clear Time (g_c+I1), s	2.1	4.4	3.3	2.1	0.0	2.9	2.5	2.3				
Green Ext Time (p_c), s	0.0	1.5	0.1	0.0	0.0	0.9	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	12.2											
HCM 6th LOS	B											

HCM 6th TWSC

1: MISSION TRAIL & ACCESS

04/07/2021

Intersection						
Int Delay, s/veh	5.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↕↕		↕	↕↕
Traffic Vol, veh/h	0	0	588	0	0	329
Future Vol, veh/h	118	119	522	118	119	263
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	129	567	128	129	286
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1032	348	0	0	695	0
Stage 1	631	-	-	-	-	-
Stage 2	401	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	229	648	-	-	897	-
Stage 1	492	-	-	-	-	-
Stage 2	645	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	196	648	-	-	897	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	24.7	0	3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	434	897	-	
HCM Lane V/C Ratio	-	-	0.594	0.144	-	
HCM Control Delay (s)	-	-	24.7	9.7	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	3.7	0.5	-	

Timings

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/07/2021

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	162	334	36	345	334	120	208	356	220
Future Volume (vph)	162	355	36	366	366	120	208	388	220
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4	3	8		5	2	1	6
Permitted Phases					8				
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	43.8	9.6	37.8	37.8	9.6	38.2	9.6	33.2
Total Split (s)	15.4	43.8	9.6	38.0	38.0	14.8	38.6	13.0	36.8
Total Split (%)	14.7%	41.7%	9.1%	36.2%	36.2%	14.1%	36.8%	12.4%	35.0%
Yellow Time (s)	3.6	4.8	3.6	4.8	4.8	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	5.8	4.6	5.2	4.6	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	10.8	25.8	5.0	13.9	13.9	9.4	12.6	8.5	11.7
Actuated g/C Ratio	0.16	0.39	0.08	0.21	0.21	0.14	0.19	0.13	0.18
v/c Ratio	0.58	0.34	0.27	0.51	0.60	0.49	0.24	0.91	0.57
Control Delay	36.9	15.3	36.8	25.9	7.3	34.9	22.3	58.4	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	15.3	36.8	25.9	7.3	34.9	22.3	58.4	16.9
LOS	D	B	D	C	A	C	C	E	B
Approach Delay		21.1		17.5			26.7		37.1
Approach LOS		C		B			C		D

Intersection Summary

Cycle Length: 105

Actuated Cycle Length: 66.1

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 25.8

Intersection LOS: C

Intersection Capacity Utilization 54.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: DIAMOND & E LAKESHORE/MISSION TRAIL

			
Ø1	Ø2	Ø3	Ø4
13 s	38.6 s	9.6 s	43.8 s
			
Ø5	Ø6	Ø7	Ø8
14.8 s	36.8 s	15.4 s	38 s

HCM 6th Signalized Intersection Summary

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	334	91	36	345	334	120	208	18	356	220	190
Future Volume (veh/h)	162	355	91	36	366	366	120	208	18	388	220	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	167	366	94	37	377	377	124	214	19	400	227	196
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	1062	269	66	1059	472	159	724	63	440	350	288
Arrive On Green	0.12	0.38	0.38	0.04	0.30	0.30	0.09	0.15	0.15	0.13	0.19	0.19
Sat Flow, veh/h	1781	2807	712	1781	3554	1585	1781	4783	416	3456	1849	1524
Grp Volume(v), veh/h	167	230	230	37	377	377	124	151	82	400	218	205
Grp Sat Flow(s),veh/h/ln	1781	1777	1742	1781	1777	1585	1781	1702	1795	1728	1777	1596
Q Serve(g_s), s	6.0	6.1	6.2	1.3	5.5	14.5	4.5	2.6	2.7	7.5	7.5	7.9
Cycle Q Clear(g_c), s	6.0	6.1	6.2	1.3	5.5	14.5	4.5	2.6	2.7	7.5	7.5	7.9
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.23	1.00		0.96
Lane Grp Cap(c), veh/h	209	672	659	66	1059	472	159	515	272	440	336	302
V/C Ratio(X)	0.80	0.34	0.35	0.56	0.36	0.80	0.78	0.29	0.30	0.91	0.65	0.68
Avail Cap(c_a), veh/h	291	1022	1002	135	1733	773	275	1722	908	440	850	764
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	14.7	14.7	31.3	18.2	21.4	29.4	24.9	24.9	28.4	24.7	24.9
Incr Delay (d2), s/veh	10.1	0.3	0.3	7.1	0.2	3.1	7.9	0.3	0.6	22.8	2.1	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	2.3	2.3	0.7	2.0	5.0	2.2	1.0	1.1	4.3	3.1	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	15.0	15.0	38.3	18.4	24.5	37.3	25.2	25.5	51.2	26.8	27.6
LnGrp LOS	D	B	B	D	B	C	D	C	C	D	C	C
Approach Vol, veh/h		627			791			357			823	
Approach Delay, s/veh		21.3			22.2			29.5			38.9	
Approach LOS		C			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	15.2	7.1	30.8	10.5	17.7	12.4	25.5				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.8	4.6	5.2	4.6	5.8				
Max Green Setting (Gmax), s	8.4	33.4	5.0	38.0	10.2	31.6	10.8	32.2				
Max Q Clear Time (g_c+I1), s	9.5	4.7	3.3	8.2	6.5	9.9	8.0	16.5				
Green Ext Time (p_c), s	0.0	1.4	0.0	3.0	0.1	2.5	0.1	3.2				
Intersection Summary												
HCM 6th Ctrl Delay			28.3									
HCM 6th LOS			C									

Timings

3: DIAMOND & AUTO CENTER/CASINO

04/07/2021

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	101	154	37	73	91	612	148	536
Future Volume (vph)	101	154	42	73	102	628	148	552
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	38.2	38.2	36.2	36.2	9.6	30.2	9.6	29.2
Total Split (s)	48.0	48.0	48.0	48.0	18.0	49.0	23.0	54.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	15.0%	40.8%	19.2%	45.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	4.6	5.2	4.6	5.2
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	12.2	12.2	12.2	12.2	9.1	17.3	8.2	19.2
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.17	0.33	0.15	0.36
v/c Ratio	0.39	0.35	0.18	0.27	0.34	0.41	0.28	0.52
Control Delay	24.6	11.4	20.8	8.3	25.0	14.6	23.8	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	11.4	20.8	8.3	25.0	14.6	23.8	16.4
LOS	C	B	C	A	C	B	C	B
Approach Delay		14.8		10.3		16.0		17.8
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 53.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 15.8

Intersection LOS: B

Intersection Capacity Utilization 56.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: DIAMOND & AUTO CENTER/CASINO



HCM 6th Signalized Intersection Summary

3: DIAMOND & AUTO CENTER/CASINO

04/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	154	129	37	73	148	91	612	34	148	536	92
Future Volume (veh/h)	101	154	140	42	73	148	102	628	39	148	552	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	157	143	43	74	151	104	641	40	151	563	94
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	372	468	397	361	456	407	163	1478	92	334	932	155
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.09	0.30	0.30	0.10	0.31	0.31
Sat Flow, veh/h	1156	1823	1546	1079	1777	1585	1781	4915	305	3456	3048	507
Grp Volume(v), veh/h	103	153	147	43	74	151	104	443	238	151	327	330
Grp Sat Flow(s),veh/h/ln	1156	1777	1592	1079	1777	1585	1781	1702	1815	1728	1777	1779
Q Serve(g_s), s	3.5	3.0	3.3	1.5	1.4	3.4	2.4	4.5	4.6	1.8	6.8	6.8
Cycle Q Clear(g_c), s	6.9	3.0	3.3	4.8	1.4	3.4	2.4	4.5	4.6	1.8	6.8	6.8
Prop In Lane	1.00		0.97	1.00		1.00	1.00		0.17	1.00		0.29
Lane Grp Cap(c), veh/h	372	456	409	361	456	407	163	1024	546	334	543	544
V/C Ratio(X)	0.28	0.33	0.36	0.12	0.16	0.37	0.64	0.43	0.44	0.45	0.60	0.61
Avail Cap(c_a), veh/h	1216	1753	1571	1149	1753	1564	550	3437	1833	1466	1999	2001
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.1	13.1	13.2	15.2	12.5	13.2	19.0	12.2	12.2	18.5	12.8	12.8
Incr Delay (d2), s/veh	0.4	0.4	0.5	0.1	0.2	0.6	4.1	0.3	0.5	1.0	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	1.0	1.0	0.3	0.5	1.0	1.0	1.4	1.5	0.7	2.3	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.5	13.5	13.7	15.3	12.7	13.8	23.1	12.5	12.8	19.5	13.9	13.9
LnGrp LOS	B	B	B	B	B	B	C	B	B	B	B	B
Approach Vol, veh/h		403			268			785			808	
Approach Delay, s/veh		14.4			13.7			14.0			15.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	18.2		16.3	8.6	18.5		16.3				
Change Period (Y+Rc), s	4.6	5.2		5.2	4.6	5.2		5.2				
Max Green Setting (Gmax), s	18.4	43.8		42.8	13.4	48.8		42.8				
Max Q Clear Time (g_c+I1), s	3.8	7.5		8.9	5.4	8.8		6.8				
Green Ext Time (p_c), s	0.4	4.8		2.3	0.1	4.4		1.6				
Intersection Summary												
HCM 6th Ctrl Delay				14.4								
HCM 6th LOS				B								

Timings

4: MISSION TRAIL & MALAGA

04/07/2021

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	24	3	54	93	17	65	558	19	661
Future Volume (vph)	50	3	54	93	17	65	584	19	687
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	21.6	21.6	9.6	33.2	9.6	30.4	9.6	42.2
Total Split (s)	10.0	26.1	26.1	17.1	33.2	14.4	46.2	10.6	42.4
Total Split (%)	10.0%	26.1%	26.1%	17.1%	33.2%	14.4%	46.2%	10.6%	42.4%
Yellow Time (s)	3.6	4.2	4.2	3.6	4.2	3.6	5.4	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	5.2	4.6	5.2	4.6	6.4	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.1	11.3	11.3	10.3	14.0	8.4	35.5	6.5	29.4
Actuated g/C Ratio	0.10	0.18	0.18	0.17	0.22	0.13	0.57	0.10	0.47
v/c Ratio	0.30	0.01	0.13	0.33	0.05	0.28	0.34	0.11	0.46
Control Delay	38.8	30.7	0.6	32.2	16.0	33.8	13.4	35.4	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	30.7	0.6	32.2	16.0	33.8	13.4	35.4	19.1
LOS	D	C	A	C	B	C	B	D	B
Approach Delay		19.3			27.5		15.3		19.5
Approach LOS		B			C		B		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 62.3

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 18.3

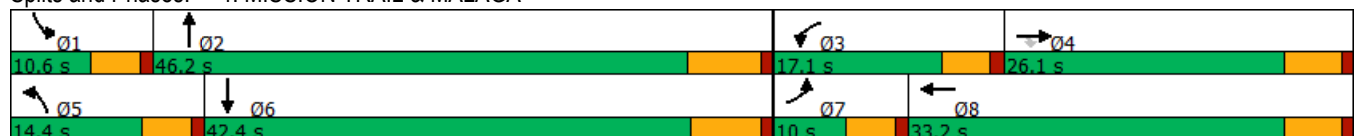
Intersection LOS: B

Intersection Capacity Utilization 48.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: MISSION TRAIL & MALAGA



HCM 6th Signalized Intersection Summary

4: MISSION TRAIL & MALAGA

04/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	3	54	93	17	21	65	558	66	19	661	18
Future Volume (veh/h)	50	3	54	93	17	21	65	584	66	19	687	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	3	56	97	18	22	68	608	69	20	716	46
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	315	267	128	337	301	106	1102	125	43	1041	67
Arrive On Green	0.05	0.17	0.17	0.07	0.19	0.19	0.06	0.34	0.34	0.02	0.31	0.31
Sat Flow, veh/h	1781	1870	1585	1781	1777	1585	1781	3217	364	1781	3390	218
Grp Volume(v), veh/h	52	3	56	97	18	22	68	335	342	20	375	387
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1777	1805	1781	1777	1831
Q Serve(g_s), s	1.5	0.1	1.6	2.8	0.4	0.6	2.0	8.1	8.1	0.6	9.8	9.8
Cycle Q Clear(g_c), s	1.5	0.1	1.6	2.8	0.4	0.6	2.0	8.1	8.1	0.6	9.8	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.12
Lane Grp Cap(c), veh/h	90	315	267	128	337	301	106	609	618	43	546	562
V/C Ratio(X)	0.58	0.01	0.21	0.76	0.05	0.07	0.64	0.55	0.55	0.47	0.69	0.69
Avail Cap(c_a), veh/h	182	739	626	421	940	839	330	1336	1357	202	1215	1253
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	18.3	19.0	24.1	17.6	17.6	24.3	14.1	14.1	25.5	16.1	16.1
Incr Delay (d2), s/veh	5.8	0.0	0.4	8.8	0.1	0.1	6.2	0.8	0.8	7.7	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.6	1.4	0.2	0.2	1.0	2.9	3.0	0.3	3.4	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.3	18.3	19.4	33.0	17.6	17.7	30.6	14.9	14.9	33.2	17.7	17.6
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h	111		137				745		782			
Approach Delay, s/veh	24.5		28.5				16.3		18.0			
Approach LOS	C		C				B		B			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	24.5	8.4	14.1	7.8	22.6	7.3	15.2				
Change Period (Y+Rc), s	4.6	6.4	4.6	5.2	4.6	* 6.4	4.6	5.2				
Max Green Setting (Gmax), s	6.0	39.8	12.5	20.9	9.8	* 36	5.4	28.0				
Max Q Clear Time (g_c+I1), s	2.6	10.1	4.8	3.6	4.0	11.8	3.5	2.6				
Green Ext Time (p_c), s	0.0	4.6	0.1	0.1	0.1	4.4	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	18.5											
HCM 6th LOS	B											
Notes												

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

Timings

5: DIAMOND & MALAGA

04/07/2021

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	14	6	59	1	1	229	28	249	1
Future Volume (vph)	14	6	85	1	1	229	28	249	1
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4	3	8	5	2	1	6	
Permitted Phases									6
Detector Phase	7	4	3	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	35.2	9.6	42.2	9.6	35.2	9.6	36.2	36.2
Total Split (s)	10.0	37.2	15.0	42.2	10.0	37.8	10.0	37.8	37.8
Total Split (%)	10.0%	37.2%	15.0%	42.2%	10.0%	37.8%	10.0%	37.8%	37.8%
Yellow Time (s)	3.6	4.2	3.6	4.2	3.6	4.2	3.6	4.2	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Act Effct Green (s)	5.8	10.7	9.2	11.3	5.8	20.5	5.8	20.5	20.5
Actuated g/C Ratio	0.16	0.30	0.26	0.32	0.16	0.57	0.16	0.57	0.57
v/c Ratio	0.05	0.01	0.20	0.03	0.00	0.16	0.11	0.13	0.00
Control Delay	18.1	13.0	14.1	0.1	19.0	9.5	18.3	10.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	13.0	14.1	0.1	19.0	9.5	18.3	10.4	0.0
LOS	B	B	B	A	B	A	B	B	A
Approach Delay		16.2		9.9		9.6		11.2	
Approach LOS		B		A		A		B	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 35.7

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.20

Intersection Signal Delay: 10.4

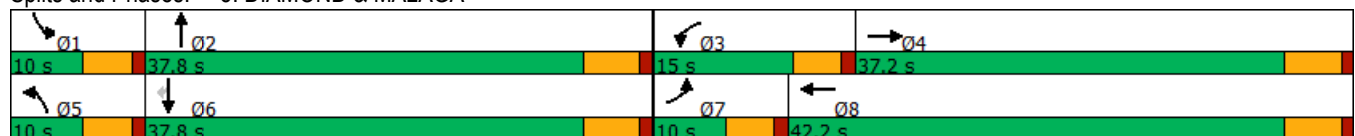
Intersection LOS: B

Intersection Capacity Utilization 34.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: DIAMOND & MALAGA



HCM 6th Signalized Intersection Summary

5: DIAMOND & MALAGA

04/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	6	2	59	1	36	1	229	35	28	249	1
Future Volume (veh/h)	14	6	2	85	1	36	1	229	61	28	249	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	15	7	2	92	1	39	1	249	66	30	271	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	34	380	104	143	353	315	4	704	183	63	1017	454
Arrive On Green	0.02	0.14	0.14	0.08	0.20	0.20	0.00	0.25	0.25	0.04	0.29	0.29
Sat Flow, veh/h	1781	2759	752	1781	1777	1585	1781	2792	725	1781	3554	1585
Grp Volume(v), veh/h	15	4	5	92	1	39	1	157	158	30	271	1
Grp Sat Flow(s),veh/h/ln	1781	1777	1735	1781	1777	1585	1781	1777	1740	1781	1777	1585
Q Serve(g_s), s	0.3	0.1	0.1	2.0	0.0	0.8	0.0	2.9	3.0	0.7	2.3	0.0
Cycle Q Clear(g_c), s	0.3	0.1	0.1	2.0	0.0	0.8	0.0	2.9	3.0	0.7	2.3	0.0
Prop In Lane	1.00		0.43	1.00		1.00	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	34	245	239	143	353	315	4	448	439	63	1017	454
V/C Ratio(X)	0.44	0.02	0.02	0.64	0.00	0.12	0.22	0.35	0.36	0.47	0.27	0.00
Avail Cap(c_a), veh/h	243	1434	1400	467	1658	1479	243	1461	1430	243	2922	1303
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	14.8	14.8	17.7	12.7	13.0	19.8	12.2	12.2	18.8	10.9	10.1
Incr Delay (d2), s/veh	8.6	0.0	0.0	4.8	0.0	0.2	23.2	0.5	0.5	5.4	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.9	0.0	0.2	0.0	0.9	1.0	0.3	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	14.8	14.8	22.4	12.7	13.2	43.0	12.6	12.7	24.2	11.1	10.1
LnGrp LOS	C	B	B	C	B	B	D	B	B	C	B	B
Approach Vol, veh/h	24			132			316			302		
Approach Delay, s/veh	22.9			19.6			12.8			12.4		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	15.2	7.8	10.7	4.7	16.6	5.4	13.1				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2				
Max Green Setting (Gmax), s	5.4	32.6	10.4	32.0	5.4	32.6	5.4	37.0				
Max Q Clear Time (g_c+I1), s	2.7	5.0	4.0	2.1	2.0	4.3	2.3	2.8				
Green Ext Time (p_c), s	0.0	1.8	0.1	0.0	0.0	1.8	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay	14.1											
HCM 6th LOS	B											

APPENDIX E. SIGNAL WARRANT ANALYSIS

EAP Condition – AM Peak Hour

Mission Trail / Driveway (#1)

CA MUTCD Section 4C.4 Warrant 3, Peak Hour

WARRANT 3 - Peak Hour (Part A or Part B must be satisfied)

SATISFIED YES ☐ NO ☒

PART A

SATISFIED YES ☐ NO ☒

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; <u>AND</u>	Yes ☐	No ☒
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u>	Yes ☒	No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes ☒	No ☐

PART B

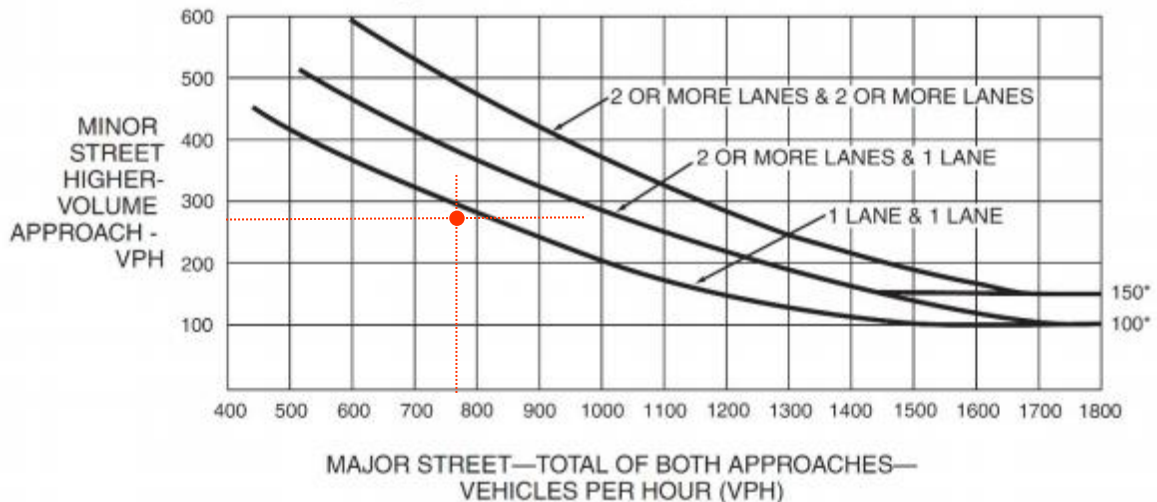
SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		774	
Higher Approach - Minor Street	271		

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes ☐	No ☒
<u>OR</u> , The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes ☐	No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-3. Warrant 3, Peak Hour



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

EAP Condition – PM Peak Hour

Mission Trail / Driveway (#1)

CA MUTCD Section 4C.4 Warrant 3, Peak Hour

WARRANT 3 - Peak Hour (Part A or Part B must be satisfied)

SATISFIED YES ☐ NO ☒

PART A

SATISFIED YES ☐ NO ☒

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; <u>AND</u>	Yes ☐	No ☒
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u>	Yes ☒	No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes ☒	No ☐

PART B

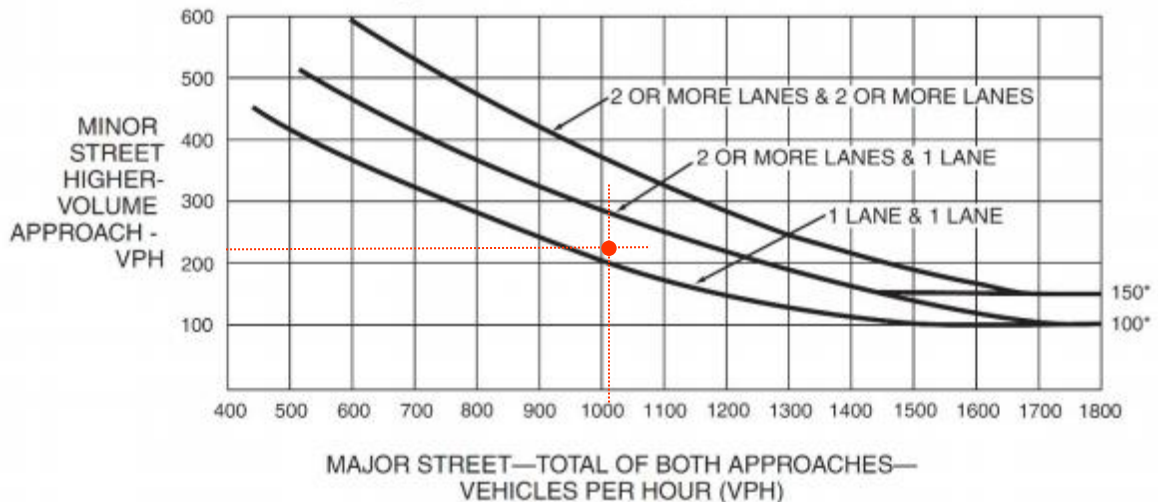
SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		1022	
Higher Approach - Minor Street	237		

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes ☐	No ☒
<u>OR</u> , The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes ☐	No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-3. Warrant 3, Peak Hour



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

EAPC Condition – AM Peak Hour

Mission Trail / Driveway (#1)

CA MUTCD Section 4C.4 Warrant 3, Peak Hour

WARRANT 3 - Peak Hour (Part A or Part B must be satisfied)

SATISFIED YES ☐ NO ☒

PART A

SATISFIED YES ☐ NO ☒

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; <u>AND</u>	Yes ☐	No ☒
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u>	Yes ☒	No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes ☒	No ☐

PART B

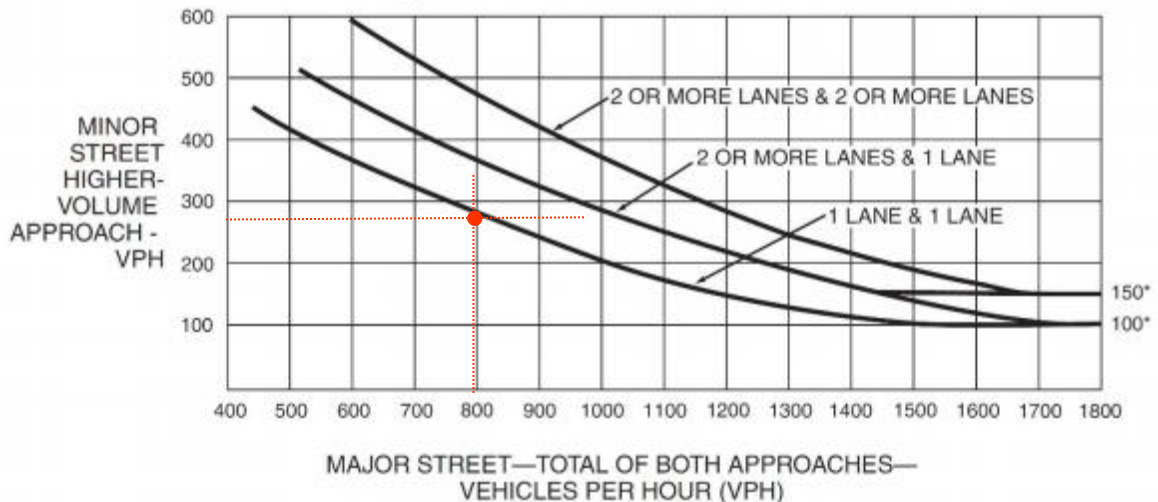
SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		796	
Higher Approach - Minor Street	271		

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes ☐	No ☒
<u>OR</u> , The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes ☐	No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-3. Warrant 3, Peak Hour



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

EAPC Condition – PM Peak Hour

Mission Trail / Driveway (#1)

CA MUTCD Section 4C.4 Warrant 3, Peak Hour

WARRANT 3 - Peak Hour (Part A or Part B must be satisfied)

SATISFIED YES ☐ NO ☒

PART A

SATISFIED YES ☐ NO ☒

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; <u>AND</u>	Yes ☐	No ☒
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u>	Yes ☒	No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes ☒	No ☐

PART B

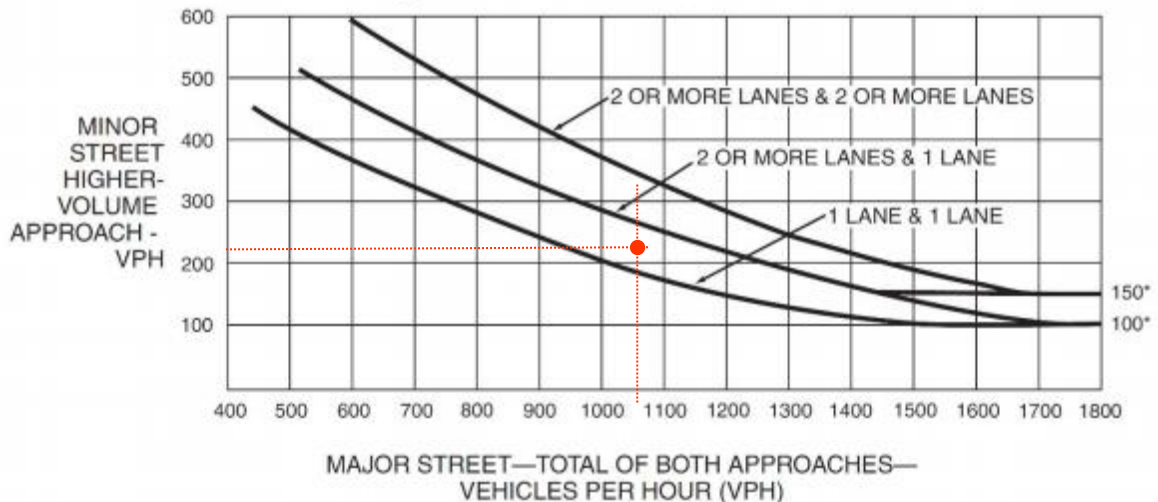
SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		1062	
Higher Approach - Minor Street	237		

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes ☐	No ☒
<u>OR</u> , The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes ☐	No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-3. Warrant 3, Peak Hour



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

APPENDIX F. EAPC CONDITION LOS ANALYSIS REPORTS

HCM 6th TWSC
1: MISSION TRAIL & ACCESS

04/15/2021

Intersection						
Int Delay, s/veh	6.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↕↕		↕	↕↕
Traffic Vol, veh/h	0	0	434	0	0	258
Future Vol, veh/h	136	135	350	136	136	174
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	148	147	380	148	148	189
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	845	264	0	0	528	0
Stage 1	454	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	302	734	-	-	1035	-
Stage 1	606	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	259	734	-	-	1035	-
Mov Cap-2 Maneuver	384	-	-	-	-	-
Stage 1	606	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	21.7	0	4			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	504	1035	-	
HCM Lane V/C Ratio	-	-	0.584	0.143	-	
HCM Control Delay (s)	-	-	21.7	9.1	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	3.7	0.5	-	

Timings

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/15/2021

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	122	172	22	201	275	46	336	280	406
Future Volume (vph)	122	193	22	222	305	46	336	311	406
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4	3	8		5	2	1	6
Permitted Phases					8				
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	43.8	9.6	37.8	37.8	9.6	38.2	9.6	33.2
Total Split (s)	15.4	43.8	9.6	38.0	38.0	14.8	38.6	13.0	36.8
Total Split (%)	14.7%	41.7%	9.1%	36.2%	36.2%	14.1%	36.8%	12.4%	35.0%
Yellow Time (s)	3.6	4.8	3.6	4.8	4.8	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	5.8	4.6	5.2	4.6	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	10.1	23.5	5.1	12.1	12.1	7.6	16.0	8.6	22.0
Actuated g/C Ratio	0.15	0.35	0.08	0.18	0.18	0.11	0.24	0.13	0.33
v/c Ratio	0.53	0.23	0.19	0.40	0.61	0.26	0.33	0.81	0.53
Control Delay	37.0	16.3	37.1	27.7	8.7	33.5	21.5	47.7	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	16.3	37.1	27.7	8.7	33.5	21.5	47.7	21.1
LOS	D	B	D	C	A	C	C	D	C
Approach Delay		23.2		17.5			22.9		30.9
Approach LOS		C		B			C		C

Intersection Summary

Cycle Length: 105

Actuated Cycle Length: 67.3

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 24.7

Intersection LOS: C

Intersection Capacity Utilization 51.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: DIAMOND & E LAKESHORE/MISSION TRAIL

			
Ø1	Ø2	Ø3	Ø4
13 s	38.6 s	9.6 s	43.8 s
			
Ø5	Ø6	Ø7	Ø8
14.8 s	36.8 s	15.4 s	38 s

HCM 6th Signalized Intersection Summary

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	172	55	22	201	275	46	336	10	280	406	125
Future Volume (veh/h)	122	193	55	22	222	305	46	336	10	311	406	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	139	219	62	25	252	347	52	382	11	353	461	142
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	956	264	50	980	437	85	836	24	455	664	203
Arrive On Green	0.10	0.35	0.35	0.03	0.28	0.28	0.05	0.16	0.16	0.13	0.25	0.25
Sat Flow, veh/h	1781	2750	760	1781	3554	1585	1781	5102	146	3456	2680	819
Grp Volume(v), veh/h	139	140	141	25	252	347	52	254	139	353	304	299
Grp Sat Flow(s),veh/h/ln	1781	1777	1734	1781	1777	1585	1781	1702	1844	1728	1777	1723
Q Serve(g_s), s	4.7	3.4	3.6	0.9	3.4	12.5	1.8	4.2	4.2	6.1	9.6	9.7
Cycle Q Clear(g_c), s	4.7	3.4	3.6	0.9	3.4	12.5	1.8	4.2	4.2	6.1	9.6	9.7
Prop In Lane	1.00		0.44	1.00		1.00	1.00		0.08	1.00		0.48
Lane Grp Cap(c), veh/h	179	618	603	50	980	437	85	557	302	455	440	427
V/C Ratio(X)	0.78	0.23	0.23	0.50	0.26	0.79	0.61	0.46	0.46	0.78	0.69	0.70
Avail Cap(c_a), veh/h	313	1098	1071	145	1861	830	295	1849	1002	472	913	885
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	14.2	14.2	29.4	17.4	20.7	28.7	23.2	23.3	25.8	21.0	21.1
Incr Delay (d2), s/veh	7.1	0.2	0.2	7.4	0.1	3.3	6.9	0.6	1.1	7.7	2.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	1.3	1.3	0.4	1.2	4.3	0.9	1.6	1.8	2.8	3.8	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	14.4	14.4	36.8	17.5	24.0	35.6	23.8	24.3	33.5	23.0	23.1
LnGrp LOS	C	B	B	D	B	C	D	C	C	C	C	C
Approach Vol, veh/h		420			624			445			956	
Approach Delay, s/veh		20.9			21.9			25.4			26.9	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.7	15.3	6.3	27.2	7.5	20.4	10.8	22.8				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.8	4.6	5.2	4.6	5.8				
Max Green Setting (Gmax), s	8.4	33.4	5.0	38.0	10.2	31.6	10.8	32.2				
Max Q Clear Time (g_c+I1), s	8.1	6.2	2.9	5.6	3.8	11.7	6.7	14.5				
Green Ext Time (p_c), s	0.0	2.4	0.0	1.7	0.0	3.5	0.1	2.5				
Intersection Summary												
HCM 6th Ctrl Delay			24.3									
HCM 6th LOS			C									

Timings

3: DIAMOND & AUTO CENTER/CASINO

04/15/2021

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	117	34	9	25	43	656	115	777
Future Volume (vph)	117	34	14	25	53	671	115	793
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	38.2	38.2	36.2	36.2	9.6	30.2	9.6	29.2
Total Split (s)	48.0	48.0	48.0	48.0	18.0	49.0	23.0	54.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	15.0%	40.8%	19.2%	45.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	4.6	5.2	4.6	5.2
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	13.4	13.4	13.4	13.4	8.0	22.5	8.3	25.6
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.14	0.39	0.15	0.45
v/c Ratio	0.41	0.12	0.05	0.11	0.23	0.37	0.24	0.61
Control Delay	27.2	11.1	22.4	10.5	29.5	13.4	27.7	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	11.1	22.4	10.5	29.5	13.4	27.7	15.3
LOS	C	B	C	B	C	B	C	B
Approach Delay		20.0		12.3		14.6		16.7
Approach LOS		C		B		B		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 57.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 16.1

Intersection LOS: B

Intersection Capacity Utilization 54.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: DIAMOND & AUTO CENTER/CASINO



HCM 6th Signalized Intersection Summary

3: DIAMOND & AUTO CENTER/CASINO

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	34	50	9	25	58	43	656	20	115	777	96
Future Volume (veh/h)	117	34	60	14	25	58	53	671	25	115	793	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	124	36	64	15	27	62	56	714	27	122	844	102
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	392	378	337	388	378	337	99	1908	72	295	1302	157
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.06	0.38	0.38	0.09	0.41	0.41
Sat Flow, veh/h	1308	1777	1585	1295	1777	1585	1781	5050	190	3456	3192	386
Grp Volume(v), veh/h	124	36	64	15	27	62	56	481	260	122	470	476
Grp Sat Flow(s),veh/h/ln	1308	1777	1585	1295	1777	1585	1781	1702	1836	1728	1777	1801
Q Serve(g_s), s	4.0	0.8	1.5	0.4	0.6	1.5	1.4	4.7	4.8	1.5	9.9	9.9
Cycle Q Clear(g_c), s	5.5	0.8	1.5	2.0	0.6	1.5	1.4	4.7	4.8	1.5	9.9	9.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.10	1.00		0.21
Lane Grp Cap(c), veh/h	392	378	337	388	378	337	99	1286	694	295	725	735
V/C Ratio(X)	0.32	0.10	0.19	0.04	0.07	0.18	0.57	0.37	0.38	0.41	0.65	0.65
Avail Cap(c_a), veh/h	1322	1642	1465	1309	1642	1465	515	3219	1737	1373	1872	1898
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	14.6	15.0	15.8	14.6	14.9	21.3	10.4	10.4	20.1	11.0	11.0
Incr Delay (d2), s/veh	0.5	0.1	0.3	0.0	0.1	0.3	5.0	0.2	0.3	0.9	1.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.3	0.5	0.1	0.2	0.5	0.7	1.4	1.6	0.6	3.1	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	14.8	15.2	15.8	14.7	15.2	26.4	10.6	10.8	21.0	12.0	12.0
LnGrp LOS	B	B	B	B	B	B	C	B	B	C	B	B
Approach Vol, veh/h		224			104			797			1068	
Approach Delay, s/veh		16.5			15.1			11.8			13.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	22.7		15.1	7.2	24.1		15.1				
Change Period (Y+Rc), s	4.6	5.2		5.2	4.6	5.2		5.2				
Max Green Setting (Gmax), s	18.4	43.8		42.8	13.4	48.8		42.8				
Max Q Clear Time (g_c+l1), s	3.5	7.7		7.5	4.4	11.9		4.0				
Green Ext Time (p_c), s	0.3	5.3		1.0	0.1	7.0		0.5				
Intersection Summary												
HCM 6th Ctrl Delay				13.0								
HCM 6th LOS				B								

Timings

4: MISSION TRAIL & MALAGA

04/15/2021

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	16	6	28	36	13	56	404	12	280
Future Volume (vph)	42	6	28	36	13	56	430	12	306
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	21.6	21.6	9.6	33.2	9.6	30.4	9.6	42.2
Total Split (s)	10.0	26.1	26.1	17.1	33.2	14.4	46.2	10.6	42.4
Total Split (%)	10.0%	26.1%	26.1%	17.1%	33.2%	14.4%	46.2%	10.6%	42.4%
Yellow Time (s)	3.6	4.2	4.2	3.6	4.2	3.6	5.4	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	5.2	4.6	5.2	4.6	6.4	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.2	11.4	11.4	7.5	12.2	8.0	29.7	6.5	24.9
Actuated g/C Ratio	0.16	0.25	0.25	0.16	0.27	0.18	0.65	0.14	0.55
v/c Ratio	0.18	0.02	0.06	0.14	0.04	0.21	0.24	0.06	0.21
Control Delay	25.6	21.8	0.2	23.8	12.3	23.3	10.0	25.7	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	21.8	0.2	23.8	12.3	23.3	10.0	25.7	14.8
LOS	C	C	A	C	B	C	B	C	B
Approach Delay		15.9			18.3		11.4		15.2
Approach LOS		B			B		B		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 45.6

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.24

Intersection Signal Delay: 13.5

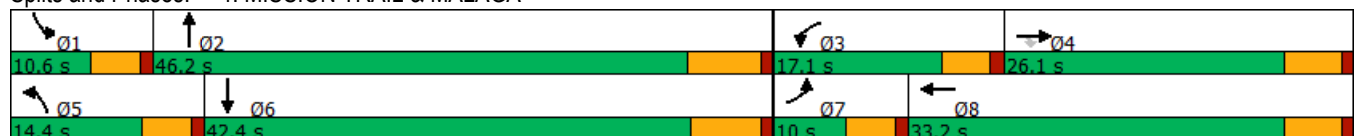
Intersection LOS: B

Intersection Capacity Utilization 38.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: MISSION TRAIL & MALAGA



HCM 6th Signalized Intersection Summary

4: MISSION TRAIL & MALAGA

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	6	28	36	13	21	56	404	42	12	280	5
Future Volume (veh/h)	42	6	28	36	13	21	56	430	42	12	306	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	7	33	42	15	24	65	500	49	14	356	36
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	92	341	289	82	314	280	111	899	88	32	751	75
Arrive On Green	0.05	0.18	0.18	0.05	0.18	0.18	0.06	0.27	0.27	0.02	0.23	0.23
Sat Flow, veh/h	1781	1870	1585	1781	1777	1585	1781	3270	319	1781	3261	328
Grp Volume(v), veh/h	49	7	33	42	15	24	65	271	278	14	193	199
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1777	1813	1781	1777	1811
Q Serve(g_s), s	1.2	0.1	0.8	1.0	0.3	0.5	1.5	5.7	5.7	0.3	4.1	4.1
Cycle Q Clear(g_c), s	1.2	0.1	0.8	1.0	0.3	0.5	1.5	5.7	5.7	0.3	4.1	4.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.18	1.00		0.18
Lane Grp Cap(c), veh/h	92	341	289	82	314	280	111	489	498	32	409	417
V/C Ratio(X)	0.54	0.02	0.11	0.52	0.05	0.09	0.58	0.55	0.56	0.44	0.47	0.48
Avail Cap(c_a), veh/h	222	900	763	513	1146	1022	402	1629	1662	246	1481	1510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.1	14.6	14.8	20.2	14.8	14.9	19.8	13.5	13.5	21.1	14.4	14.5
Incr Delay (d2), s/veh	4.8	0.0	0.2	5.0	0.1	0.1	4.8	1.0	1.0	9.2	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.2	0.5	0.1	0.2	0.7	2.0	2.1	0.2	1.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	14.6	15.0	25.2	14.9	15.1	24.6	14.5	14.5	30.3	15.3	15.3
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h	89			81			614			406		
Approach Delay, s/veh	20.4			20.3			15.5			15.8		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.4	18.3	6.6	13.1	7.3	16.4	6.8	12.9				
Change Period (Y+Rc), s	4.6	6.4	4.6	5.2	4.6	* 6.4	4.6	5.2				
Max Green Setting (Gmax), s	6.0	39.8	12.5	20.9	9.8	* 36	5.4	28.0				
Max Q Clear Time (g_c+I1), s	2.3	7.7	3.0	2.8	3.5	6.1	3.2	2.5				
Green Ext Time (p_c), s	0.0	3.6	0.0	0.1	0.1	2.1	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	16.3											
HCM 6th LOS	B											
Notes												

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

Timings

5: DIAMOND & MALAGA

04/15/2021

									
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT	SBR	Ø5
Lane Configurations									
Traffic Volume (vph)	19	7	38	7	242	17	196	18	
Future Volume (vph)	19	7	64	7	242	17	196	18	
Turn Type	Prot	NA	Prot	NA	NA	Prot	NA	Perm	
Protected Phases	7	4	3	8	2	1	6		5
Permitted Phases								6	
Detector Phase	7	4	3	8	2	1	6	6	
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0
Minimum Split (s)	9.6	35.2	9.6	42.2	35.2	9.6	36.2	36.2	9.6
Total Split (s)	10.0	37.2	15.0	42.2	37.8	10.0	37.8	37.8	10.0
Total Split (%)	10.0%	37.2%	15.0%	42.2%	37.8%	10.0%	37.8%	37.8%	10%
Yellow Time (s)	3.6	4.2	3.6	4.2	4.2	3.6	4.2	4.2	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.2	4.6	5.2	5.2	4.6	5.2	5.2	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min	Min	None
Act Effct Green (s)	6.0	11.2	8.4	11.7	24.2	6.0	25.4	25.4	
Actuated g/C Ratio	0.18	0.33	0.25	0.34	0.71	0.18	0.75	0.75	
v/c Ratio	0.07	0.01	0.17	0.02	0.14	0.06	0.09	0.02	
Control Delay	17.4	12.4	13.9	8.1	8.2	17.4	6.1	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.4	12.4	13.9	8.1	8.2	17.4	6.1	0.0	
LOS	B	B	B	A	A	B	A	A	
Approach Delay		15.7		12.4	8.2		6.5		
Approach LOS		B		B	A		A		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 34

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.17

Intersection Signal Delay: 8.5

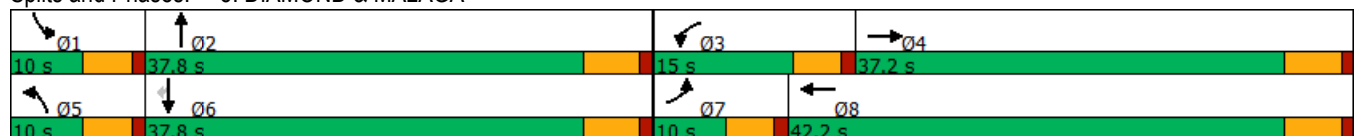
Intersection LOS: A

Intersection Capacity Utilization 31.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: DIAMOND & MALAGA



HCM 6th Signalized Intersection Summary

5: DIAMOND & MALAGA

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	7	3	38	7	15	0	242	24	17	196	18
Future Volume (veh/h)	19	7	3	64	7	15	0	242	50	17	196	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	8	3	74	8	17	0	278	57	20	225	21
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	48	350	123	126	319	285	5	764	154	45	1435	640
Arrive On Green	0.03	0.14	0.14	0.07	0.18	0.18	0.00	0.26	0.26	0.03	0.40	0.40
Sat Flow, veh/h	1781	2575	909	1781	1777	1585	1781	2945	595	1781	3554	1585
Grp Volume(v), veh/h	22	5	6	74	8	17	0	166	169	20	225	21
Grp Sat Flow(s),veh/h/ln	1781	1777	1707	1781	1777	1585	1781	1777	1763	1781	1777	1585
Q Serve(g_s), s	0.5	0.1	0.1	1.6	0.1	0.3	0.0	2.9	3.0	0.4	1.6	0.3
Cycle Q Clear(g_c), s	0.5	0.1	0.1	1.6	0.1	0.3	0.0	2.9	3.0	0.4	1.6	0.3
Prop In Lane	1.00		0.53	1.00		1.00	1.00		0.34	1.00		1.00
Lane Grp Cap(c), veh/h	48	241	232	126	319	285	5	461	458	45	1435	640
V/C Ratio(X)	0.45	0.02	0.02	0.59	0.03	0.06	0.00	0.36	0.37	0.45	0.16	0.03
Avail Cap(c_a), veh/h	250	1476	1417	481	1706	1522	250	1503	1492	250	3007	1341
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	14.4	14.4	17.3	13.0	13.1	0.0	11.7	11.7	18.5	7.3	6.9
Incr Delay (d2), s/veh	6.5	0.0	0.0	4.2	0.0	0.1	0.0	0.5	0.5	6.9	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.7	0.0	0.1	0.0	0.9	1.0	0.2	0.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	14.5	14.5	21.6	13.1	13.2	0.0	12.1	12.2	25.4	7.4	7.0
LnGrp LOS	C	B	B	C	B	B	A	B	B	C	A	A
Approach Vol, veh/h	33			99			335			266		
Approach Delay, s/veh	21.5			19.5			12.2			8.7		
Approach LOS	C			B			B			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.6	15.2	7.3	10.4	0.0	20.8	5.6	12.1				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2				
Max Green Setting (Gmax), s	5.4	32.6	10.4	32.0	5.4	32.6	5.4	37.0				
Max Q Clear Time (g_c+I1), s	2.4	5.0	3.6	2.1	0.0	3.6	2.5	2.3				
Green Ext Time (p_c), s	0.0	1.9	0.1	0.0	0.0	1.5	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	12.3											
HCM 6th LOS	B											

HCM 6th TWSC

1: MISSION TRAIL & ACCESS

04/15/2021

Intersection						
Int Delay, s/veh	5.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↕↕		↔	↕↕
Traffic Vol, veh/h	0	0	615	0	0	342
Future Vol, veh/h	118	119	549	118	119	276
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	129	597	128	129	300
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1069	363	0	0	725	0
Stage 1	661	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	216	634	-	-	874	-
Stage 1	475	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	184	634	-	-	874	-
Mov Cap-2 Maneuver	315	-	-	-	-	-
Stage 1	475	-	-	-	-	-
Stage 2	545	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	26.1	0	3			
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	421	874	-	
HCM Lane V/C Ratio	-	-	0.612	0.148	-	
HCM Control Delay (s)	-	-	26.1	9.8	-	
HCM Lane LOS	-	-	D	A	-	
HCM 95th %tile Q(veh)	-	-	4	0.5	-	

Timings

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/15/2021

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	179	340	36	377	398	141	450	363	674
Future Volume (vph)	179	361	36	398	430	141	450	395	674
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4	3	8		5	2	1	6
Permitted Phases					8				
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	43.8	9.6	37.8	37.8	9.6	38.2	9.6	33.2
Total Split (s)	15.4	43.8	9.6	38.0	38.0	14.8	38.6	13.0	36.8
Total Split (%)	14.7%	41.7%	9.1%	36.2%	36.2%	14.1%	36.8%	12.4%	35.0%
Yellow Time (s)	3.6	4.8	3.6	4.8	4.8	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	5.8	4.6	5.2	4.6	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	11.0	28.8	5.1	18.5	18.5	10.1	29.3	8.5	27.7
Actuated g/C Ratio	0.13	0.33	0.06	0.21	0.21	0.12	0.33	0.10	0.32
v/c Ratio	0.84	0.41	0.36	0.55	0.76	0.71	0.29	1.22	0.82
Control Delay	72.0	23.5	54.6	33.8	18.3	60.8	22.4	160.0	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
Total Delay	72.0	23.5	54.6	33.8	18.3	60.8	22.4	160.0	46.9
LOS	E	C	D	C	B	E	C	F	D
Approach Delay		37.1		27.0			31.3		82.1
Approach LOS		D		C			C		F

Intersection Summary

Cycle Length: 105

Actuated Cycle Length: 87.8

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.22

Intersection Signal Delay: 50.3

Intersection LOS: D

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: DIAMOND & E LAKESHORE/MISSION TRAIL

			
Ø1	Ø2	Ø3	Ø4
13 s	38.6 s	9.6 s	43.8 s
			
Ø5	Ø6	Ø7	Ø8
14.8 s	36.8 s	15.4 s	38 s

HCM 6th Signalized Intersection Summary

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	340	102	36	377	398	141	450	18	363	674	202
Future Volume (veh/h)	179	361	102	36	398	430	141	450	18	395	674	202
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	185	372	105	37	410	443	145	464	19	407	695	208
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	192	1039	290	57	1077	480	175	1533	62	289	782	234
Arrive On Green	0.11	0.38	0.38	0.03	0.30	0.30	0.10	0.30	0.30	0.08	0.29	0.29
Sat Flow, veh/h	1781	2744	765	1781	3554	1585	1781	5033	205	3456	2696	807
Grp Volume(v), veh/h	185	239	238	37	410	443	145	313	170	407	458	445
Grp Sat Flow(s),veh/h/ln	1781	1777	1733	1781	1777	1585	1781	1702	1833	1728	1777	1725
Q Serve(g_s), s	10.4	9.7	9.9	2.1	9.1	27.2	8.0	7.1	7.1	8.4	24.8	24.8
Cycle Q Clear(g_c), s	10.4	9.7	9.9	2.1	9.1	27.2	8.0	7.1	7.1	8.4	24.8	24.8
Prop In Lane	1.00		0.44	1.00		1.00	1.00		0.11	1.00		0.47
Lane Grp Cap(c), veh/h	192	672	656	57	1077	480	175	1037	559	289	516	501
V/C Ratio(X)	0.97	0.36	0.36	0.65	0.38	0.92	0.83	0.30	0.30	1.41	0.89	0.89
Avail Cap(c_a), veh/h	192	672	656	89	1139	508	181	1132	610	289	559	543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.6	22.4	22.5	48.0	27.6	33.9	44.5	26.7	26.8	46.0	34.1	34.1
Incr Delay (d2), s/veh	54.9	0.3	0.3	11.7	0.2	21.9	25.8	0.2	0.3	203.0	15.3	15.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	4.1	4.0	1.1	3.7	12.7	4.7	2.8	3.1	11.7	12.5	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	99.5	22.7	22.8	59.7	27.8	55.7	70.3	26.9	27.1	249.0	49.4	49.8
LnGrp LOS	F	C	C	E	C	E	E	C	C	F	D	D
Approach Vol, veh/h		662			890			628			1310	
Approach Delay, s/veh		44.2			43.0			37.0			111.5	
Approach LOS		D			D			D			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	35.8	7.8	43.8	14.5	34.3	15.4	36.2				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.8	4.6	5.2	4.6	5.8				
Max Green Setting (Gmax), s	8.4	33.4	5.0	38.0	10.2	31.6	10.8	32.2				
Max Q Clear Time (g_c+I1), s	10.4	9.1	4.1	11.9	10.0	26.8	12.4	29.2				
Green Ext Time (p_c), s	0.0	3.0	0.0	3.0	0.0	2.4	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay				67.9								
HCM 6th LOS				E								

Timings

3: DIAMOND & AUTO CENTER/CASINO

04/15/2021

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	101	156	44	74	91	929	157	1044
Future Volume (vph)	101	156	49	74	102	945	157	1060
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	38.2	38.2	36.2	36.2	9.6	30.2	9.6	29.2
Total Split (s)	48.0	48.0	48.0	48.0	18.0	49.0	23.0	54.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	15.0%	40.8%	19.2%	45.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	4.6	5.2	4.6	5.2
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	14.2	14.2	14.2	14.2	10.3	31.9	9.6	34.7
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.14	0.44	0.13	0.48
v/c Ratio	0.46	0.39	0.25	0.31	0.41	0.45	0.35	0.69
Control Delay	37.2	16.8	32.2	11.9	38.2	13.9	35.1	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	37.2	16.8	32.2	11.9	38.2	14.0	35.1	18.1
LOS	D	B	C	B	D	B	D	B
Approach Delay		22.0		15.4		16.3		20.2
Approach LOS		C		B		B		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 71.7

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 18.6

Intersection LOS: B

Intersection Capacity Utilization 70.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: DIAMOND & AUTO CENTER/CASINO



HCM 6th Signalized Intersection Summary

3: DIAMOND & AUTO CENTER/CASINO

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	156	129	44	74	157	91	929	40	157	1044	92
Future Volume (veh/h)	101	156	140	49	74	157	102	945	45	157	1060	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	159	143	50	76	160	104	964	46	160	1082	94
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	283	432	362	281	419	374	158	2270	108	267	1466	127
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.09	0.45	0.45	0.08	0.44	0.44
Sat Flow, veh/h	1144	1834	1537	1077	1777	1585	1781	4994	238	3456	3308	287
Grp Volume(v), veh/h	103	154	148	50	76	160	104	657	353	160	581	595
Grp Sat Flow(s),veh/h/ln	1144	1777	1594	1077	1777	1585	1781	1702	1828	1728	1777	1819
Q Serve(g_s), s	5.4	4.7	5.1	2.6	2.2	5.5	3.6	8.4	8.4	2.9	17.4	17.5
Cycle Q Clear(g_c), s	11.0	4.7	5.1	7.7	2.2	5.5	3.6	8.4	8.4	2.9	17.4	17.5
Prop In Lane	1.00		0.96	1.00		1.00	1.00		0.13	1.00		0.16
Lane Grp Cap(c), veh/h	283	419	376	281	419	374	158	1547	831	267	787	806
V/C Ratio(X)	0.36	0.37	0.39	0.18	0.18	0.43	0.66	0.42	0.43	0.60	0.74	0.74
Avail Cap(c_a), veh/h	773	1179	1058	742	1179	1052	370	2312	1241	986	1345	1376
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	20.6	20.8	24.0	19.7	20.9	28.4	11.9	11.9	28.8	14.9	14.9
Incr Delay (d2), s/veh	0.8	0.5	0.7	0.3	0.2	0.8	4.6	0.2	0.3	2.2	1.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.8	1.8	0.7	0.9	2.0	1.7	2.7	3.0	1.2	6.2	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.4	21.2	21.4	24.3	19.9	21.7	33.1	12.1	12.2	31.0	16.2	16.2
LnGrp LOS	C	C	C	C	B	C	C	B	B	C	B	B
Approach Vol, veh/h		405			286			1114			1336	
Approach Delay, s/veh		22.6			21.7			14.1			18.0	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	34.5		20.4	10.3	33.8		20.4				
Change Period (Y+Rc), s	4.6	5.2		5.2	4.6	5.2		5.2				
Max Green Setting (Gmax), s	18.4	43.8		42.8	13.4	48.8		42.8				
Max Q Clear Time (g_c+I1), s	4.9	11.4		13.0	6.6	19.5		9.7				
Green Ext Time (p_c), s	0.4	7.6		2.2	0.1	9.1		1.7				
Intersection Summary												
HCM 6th Ctrl Delay				17.5								
HCM 6th LOS				B								

Timings

4: MISSION TRAIL & MALAGA

04/15/2021

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	34	11	79	103	25	93	575	19	681
Future Volume (vph)	60	11	79	103	25	93	601	19	707
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	21.6	21.6	9.6	33.2	9.6	30.4	9.6	42.2
Total Split (s)	10.0	26.1	26.1	17.1	33.2	14.4	46.2	10.6	42.4
Total Split (%)	10.0%	26.1%	26.1%	17.1%	33.2%	14.4%	46.2%	10.6%	42.4%
Yellow Time (s)	3.6	4.2	4.2	3.6	4.2	3.6	5.4	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	5.2	4.6	5.2	4.6	6.4	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	9.8	11.3	11.3	10.0	14.3	9.1	36.6	6.5	30.4
Actuated g/C Ratio	0.15	0.17	0.17	0.15	0.22	0.14	0.55	0.10	0.46
v/c Ratio	0.24	0.03	0.19	0.40	0.07	0.40	0.37	0.11	0.48
Control Delay	37.3	31.3	1.0	35.3	16.8	37.1	14.4	36.1	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	31.3	1.0	35.3	16.8	37.1	14.4	36.1	20.8
LOS	D	C	A	D	B	D	B	D	C
Approach Delay		17.8			29.6		17.2		21.2
Approach LOS		B			C		B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 66.2

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 19.9

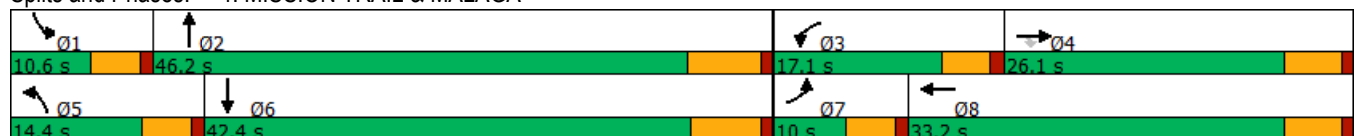
Intersection LOS: B

Intersection Capacity Utilization 50.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: MISSION TRAIL & MALAGA



HCM 6th Signalized Intersection Summary

4: MISSION TRAIL & MALAGA

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	11	79	103	25	21	93	575	76	19	681	18
Future Volume (veh/h)	60	11	79	103	25	21	93	601	76	19	707	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	62	11	82	107	26	22	97	626	79	20	736	46
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	98	320	271	140	376	282	126	1127	142	43	1047	65
Arrive On Green	0.06	0.17	0.17	0.08	0.19	0.19	0.07	0.35	0.35	0.02	0.31	0.31
Sat Flow, veh/h	1781	1870	1585	1781	1937	1449	1781	3175	400	1781	3397	212
Grp Volume(v), veh/h	62	11	82	107	24	24	97	350	355	20	385	397
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1609	1781	1777	1798	1781	1777	1832
Q Serve(g_s), s	1.9	0.3	2.5	3.3	0.6	0.7	3.0	8.9	8.9	0.6	10.7	10.7
Cycle Q Clear(g_c), s	1.9	0.3	2.5	3.3	0.6	0.7	3.0	8.9	8.9	0.6	10.7	10.7
Prop In Lane	1.00		1.00	1.00		0.90	1.00		0.22	1.00		0.12
Lane Grp Cap(c), veh/h	98	320	271	140	345	313	126	630	638	43	547	565
V/C Ratio(X)	0.63	0.03	0.30	0.77	0.07	0.08	0.77	0.55	0.56	0.47	0.70	0.70
Avail Cap(c_a), veh/h	172	699	592	398	889	805	312	1264	1279	191	1149	1185
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	19.3	20.3	25.3	18.4	18.4	25.6	14.5	14.5	27.0	17.1	17.1
Incr Delay (d2), s/veh	6.5	0.0	0.6	8.4	0.1	0.1	9.6	0.8	0.8	7.9	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.1	0.9	1.6	0.2	0.2	1.5	3.3	3.3	0.3	3.8	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.3	19.4	20.9	33.7	18.5	18.5	35.1	15.3	15.3	34.8	18.8	18.7
LnGrp LOS	C	B	C	C	B	B	D	B	B	C	B	B
Approach Vol, veh/h	155		155			802			802			
Approach Delay, s/veh	25.4		29.0			17.7			19.1			
Approach LOS	C		C			B			B			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	26.3	9.0	14.8	8.5	23.6	7.7	16.1				
Change Period (Y+Rc), s	4.6	6.4	4.6	5.2	4.6	* 6.4	4.6	5.2				
Max Green Setting (Gmax), s	6.0	39.8	12.5	20.9	9.8	* 36	5.4	28.0				
Max Q Clear Time (g_c+I1), s	2.6	10.9	5.3	4.5	5.0	12.7	3.9	2.7				
Green Ext Time (p_c), s	0.0	4.8	0.1	0.2	0.1	4.5	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay	19.8											
HCM 6th LOS	B											
Notes												

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

Timings

5: DIAMOND & MALAGA

04/15/2021

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	14	6	70	1	1	309	63	369	1
Future Volume (vph)	14	6	96	1	1	309	63	369	1
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4	3	8	5	2	1	6	
Permitted Phases									6
Detector Phase	7	4	3	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	35.2	9.6	42.2	9.6	35.2	9.6	36.2	36.2
Total Split (s)	10.0	37.2	15.0	42.2	10.0	37.8	10.0	37.8	37.8
Total Split (%)	10.0%	37.2%	15.0%	42.2%	10.0%	37.8%	10.0%	37.8%	37.8%
Yellow Time (s)	3.6	4.2	3.6	4.2	3.6	4.2	3.6	4.2	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Act Effct Green (s)	5.9	11.0	9.2	11.6	5.9	17.3	5.9	26.0	26.0
Actuated g/C Ratio	0.15	0.28	0.23	0.29	0.15	0.43	0.15	0.65	0.65
v/c Ratio	0.06	0.01	0.26	0.05	0.00	0.27	0.26	0.17	0.00
Control Delay	21.6	15.9	17.8	0.1	22.0	12.6	22.9	9.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	15.9	17.8	0.1	22.0	12.6	22.9	9.1	0.0
LOS	C	B	B	A	C	B	C	A	A
Approach Delay		19.5		11.1		12.6		11.0	
Approach LOS		B		B		B		B	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 39.8

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 11.8

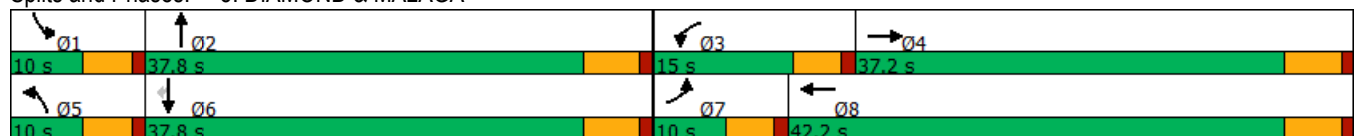
Intersection LOS: B

Intersection Capacity Utilization 37.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: DIAMOND & MALAGA



HCM 6th Signalized Intersection Summary

5: DIAMOND & MALAGA

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	6	2	70	1	57	1	309	43	63	369	1
Future Volume (veh/h)	14	6	2	96	1	57	1	309	69	63	369	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	15	7	2	104	1	62	1	336	75	68	401	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	34	418	114	149	383	342	4	685	151	116	1067	476
Arrive On Green	0.02	0.15	0.15	0.08	0.22	0.22	0.00	0.24	0.24	0.07	0.30	0.30
Sat Flow, veh/h	1781	2759	752	1781	1777	1585	1781	2894	638	1781	3554	1585
Grp Volume(v), veh/h	15	4	5	104	1	62	1	205	206	68	401	1
Grp Sat Flow(s),veh/h/ln	1781	1777	1735	1781	1777	1585	1781	1777	1756	1781	1777	1585
Q Serve(g_s), s	0.4	0.1	0.1	2.4	0.0	1.3	0.0	4.2	4.3	1.6	3.8	0.0
Cycle Q Clear(g_c), s	0.4	0.1	0.1	2.4	0.0	1.3	0.0	4.2	4.3	1.6	3.8	0.0
Prop In Lane	1.00		0.43	1.00		1.00	1.00		0.36	1.00		1.00
Lane Grp Cap(c), veh/h	34	269	263	149	383	342	4	420	415	116	1067	476
V/C Ratio(X)	0.44	0.02	0.02	0.70	0.00	0.18	0.24	0.49	0.50	0.59	0.38	0.00
Avail Cap(c_a), veh/h	228	1345	1313	438	1555	1387	228	1370	1354	228	2740	1222
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.5	15.3	15.3	18.9	13.0	13.5	21.1	13.9	14.0	19.2	11.7	10.4
Incr Delay (d2), s/veh	8.7	0.0	0.0	5.9	0.0	0.3	26.7	0.9	0.9	4.7	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.1	0.0	0.4	0.0	1.5	1.5	0.7	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.2	15.3	15.3	24.7	13.0	13.8	47.7	14.8	14.9	23.9	11.9	10.4
LnGrp LOS	C	B	B	C	B	B	D	B	B	C	B	B
Approach Vol, veh/h	24			167			412			470		
Approach Delay, s/veh	24.0			20.6			14.9			13.6		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	15.2	8.1	11.6	4.7	17.9	5.4	14.3				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.2	4.6	5.2	4.6	5.2				
Max Green Setting (Gmax), s	5.4	32.6	10.4	32.0	5.4	32.6	5.4	37.0				
Max Q Clear Time (g_c+I1), s	3.6	6.3	4.4	2.1	2.0	5.8	2.4	3.3				
Green Ext Time (p_c), s	0.0	2.4	0.1	0.0	0.0	2.8	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay	15.4											
HCM 6th LOS	B											

APPENDIX G. EAPC CONDITION LOS ANALYSIS REPORTS FOR OVERLAP PHASE

Timings

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/15/2021

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	122	172	22	201	275	46	336	280	406
Future Volume (vph)	122	193	22	222	305	46	336	311	406
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	1	5	2	1	6
Permitted Phases	8								
Detector Phase	7	4	3	8	1	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	43.8	9.6	37.8	9.6	9.6	38.2	9.6	33.2
Total Split (s)	20.0	47.3	10.5	37.8	22.0	13.7	40.2	22.0	48.5
Total Split (%)	16.7%	39.4%	8.8%	31.5%	18.3%	11.4%	33.5%	18.3%	40.4%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	5.2	4.6	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	11.1	23.5	5.9	11.4	30.3	7.5	12.6	13.0	23.1
Actuated g/C Ratio	0.16	0.34	0.09	0.17	0.44	0.11	0.18	0.19	0.34
v/c Ratio	0.49	0.24	0.16	0.43	0.42	0.27	0.42	0.54	0.51
Control Delay	34.1	17.1	36.3	29.9	7.3	35.0	27.1	29.6	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	17.1	36.3	29.9	7.3	35.0	27.1	29.6	21.1
LOS	C	B	D	C	A	C	C	C	C
Approach Delay	22.7		17.6		28.0		24.2		
Approach LOS	C		B		C		C		

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 68.7

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 23.0

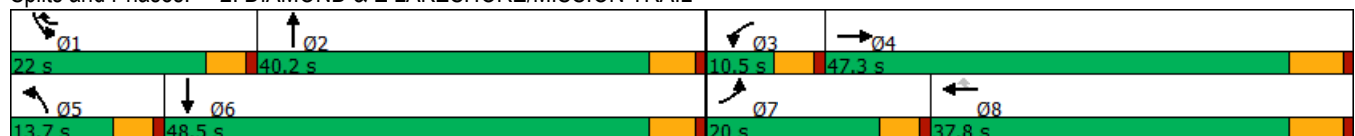
Intersection LOS: C

Intersection Capacity Utilization 51.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: DIAMOND & E LAKESHORE/MISSION TRAIL



HCM 6th Signalized Intersection Summary

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	172	55	22	201	275	46	336	10	280	406	125
Future Volume (veh/h)	122	193	55	22	222	305	46	336	10	311	406	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	139	219	62	25	252	347	52	382	11	353	461	142
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	181	880	243	51	877	621	86	856	25	501	709	217
Arrive On Green	0.10	0.32	0.32	0.03	0.25	0.25	0.05	0.17	0.17	0.15	0.26	0.26
Sat Flow, veh/h	1781	2750	760	1781	3554	1585	1781	5102	146	3456	2680	819
Grp Volume(v), veh/h	139	140	141	25	252	347	52	254	139	353	304	299
Grp Sat Flow(s),veh/h/ln	1781	1777	1734	1781	1777	1585	1781	1702	1844	1728	1777	1723
Q Serve(g_s), s	4.5	3.5	3.6	0.8	3.4	10.2	1.7	4.0	4.0	5.8	9.1	9.2
Cycle Q Clear(g_c), s	4.5	3.5	3.6	0.8	3.4	10.2	1.7	4.0	4.0	5.8	9.1	9.2
Prop In Lane	1.00		0.44	1.00		1.00	1.00		0.08	1.00		0.48
Lane Grp Cap(c), veh/h	181	569	555	51	877	621	86	571	309	501	470	455
V/C Ratio(X)	0.77	0.25	0.25	0.49	0.29	0.56	0.60	0.45	0.45	0.70	0.65	0.66
Avail Cap(c_a), veh/h	460	1237	1206	176	1907	1081	272	1998	1082	1008	1290	1251
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	15.0	15.0	28.5	18.2	14.1	27.8	22.3	22.3	24.3	19.5	19.5
Incr Delay (d2), s/veh	6.6	0.2	0.2	7.3	0.2	0.8	6.6	0.5	1.0	1.8	1.5	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	1.3	1.3	0.4	1.2	3.0	0.8	1.5	1.7	2.3	3.5	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.7	15.2	15.2	35.8	18.4	14.9	34.4	22.9	23.4	26.1	21.0	21.1
LnGrp LOS	C	B	B	D	B	B	C	C	C	C	C	C
Approach Vol, veh/h		420			624			445			956	
Approach Delay, s/veh		21.0			17.2			24.4			22.9	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.3	15.2	6.3	24.9	7.5	21.0	10.7	20.5				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.8	4.6	5.2	4.6	5.8				
Max Green Setting (Gmax), s	17.4	35.0	5.9	41.5	9.1	43.3	15.4	32.0				
Max Q Clear Time (g_c+I1), s	7.8	6.0	2.8	5.6	3.7	11.2	6.5	12.2				
Green Ext Time (p_c), s	0.9	2.5	0.0	1.8	0.0	3.9	0.2	2.5				
Intersection Summary												
HCM 6th Ctrl Delay			21.4									
HCM 6th LOS			C									

Timings

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/15/2021

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	179	340	36	377	398	141	450	363	674
Future Volume (vph)	179	361	36	398	430	141	450	395	674
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	1	5	2	1	6
Permitted Phases	8								
Detector Phase	7	4	3	8	1	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	43.8	9.6	37.8	9.6	9.6	38.2	9.6	33.2
Total Split (s)	21.0	47.4	11.4	37.8	22.3	18.4	38.9	22.3	42.8
Total Split (%)	17.5%	39.5%	9.5%	31.5%	18.6%	15.3%	32.4%	18.6%	35.7%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	4.2	3.6	4.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	5.2	4.6	5.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	14.6	30.1	6.6	17.0	39.2	12.3	27.4	16.3	31.3
Actuated g/C Ratio	0.15	0.31	0.07	0.18	0.41	0.13	0.29	0.17	0.33
v/c Ratio	0.69	0.44	0.31	0.65	0.61	0.64	0.33	0.70	0.79
Control Delay	55.3	27.9	54.5	43.3	19.7	56.4	28.0	46.6	34.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.6
Total Delay	55.3	27.9	54.5	43.3	19.7	56.4	28.0	46.8	39.4
LOS	E	C	D	D	B	E	C	D	D
Approach Delay	35.5		32.1		34.6		41.7		
Approach LOS	D		C		C		D		

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 95.9

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 36.8

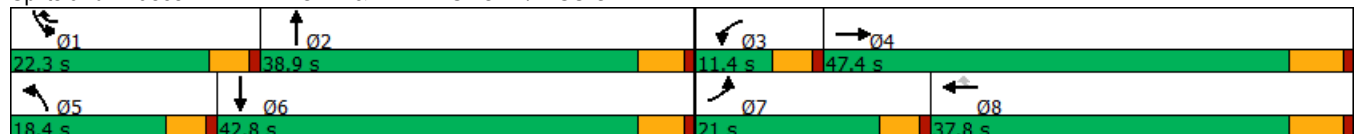
Intersection LOS: D

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: DIAMOND & E LAKESHORE/MISSION TRAIL



HCM 6th Signalized Intersection Summary

2: DIAMOND & E LAKESHORE/MISSION TRAIL

04/15/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	340	102	36	377	398	141	450	18	363	674	202
Future Volume (veh/h)	179	361	102	36	398	430	141	450	18	395	674	202
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	185	372	105	37	410	443	145	464	19	407	695	208
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	219	995	277	57	966	654	177	1325	54	486	822	246
Arrive On Green	0.12	0.36	0.36	0.03	0.27	0.27	0.10	0.26	0.26	0.14	0.30	0.30
Sat Flow, veh/h	1781	2744	765	1781	3554	1585	1781	5033	205	3456	2696	807
Grp Volume(v), veh/h	185	239	238	37	410	443	145	313	170	407	458	445
Grp Sat Flow(s),veh/h/ln	1781	1777	1733	1781	1777	1585	1781	1702	1833	1728	1777	1725
Q Serve(g_s), s	10.2	10.0	10.2	2.1	9.5	22.9	8.0	7.5	7.6	11.5	24.2	24.2
Cycle Q Clear(g_c), s	10.2	10.0	10.2	2.1	9.5	22.9	8.0	7.5	7.6	11.5	24.2	24.2
Prop In Lane	1.00		0.44	1.00		1.00	1.00		0.11	1.00		0.47
Lane Grp Cap(c), veh/h	219	644	628	57	966	654	177	896	483	486	542	526
V/C Ratio(X)	0.85	0.37	0.38	0.65	0.42	0.68	0.82	0.35	0.35	0.84	0.85	0.85
Avail Cap(c_a), veh/h	291	737	718	121	1133	728	245	1143	616	610	666	646
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.1	23.6	23.6	48.0	30.1	24.0	44.3	30.0	30.0	42.0	32.7	32.7
Incr Delay (d2), s/veh	15.8	0.4	0.4	11.7	0.3	2.2	14.3	0.2	0.4	8.2	8.3	8.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	4.2	4.2	1.1	3.9	8.3	4.2	3.0	3.3	5.4	11.3	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.9	23.9	24.0	59.7	30.4	26.2	58.6	30.2	30.5	50.2	41.0	41.2
LnGrp LOS	E	C	C	E	C	C	E	C	C	D	D	D
Approach Vol, veh/h		662			890			628			1310	
Approach Delay, s/veh		33.7			29.5			36.8			43.9	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.7	31.6	7.8	42.2	14.5	35.8	16.9	33.1				
Change Period (Y+Rc), s	4.6	5.2	4.6	5.8	4.6	5.2	4.6	5.8				
Max Green Setting (Gmax), s	17.7	33.7	6.8	41.6	13.8	37.6	16.4	32.0				
Max Q Clear Time (g_c+I1), s	13.5	9.6	4.1	12.2	10.0	26.2	12.2	24.9				
Green Ext Time (p_c), s	0.6	3.0	0.0	3.1	0.1	4.4	0.2	2.4				
Intersection Summary												
HCM 6th Ctrl Delay				37.0								
HCM 6th LOS				D								

April 22, 2021

Mr. David Berri
Berri Brothers
3199 Red Hill Ave., Suite B
Costa Mesa, CA 92626

RE: Vehicle Miles Traveled (VMT) Analysis for 31800 Mission Trail in Lake Elsinore, California

Dear Mr. Berri:

Sierra Transportation Engineers, Inc. (STE) is pleased to present the vehicles miles traveled (VMT) screening memorandum for the proposed Imperial Stations development located at 31800 Mission Trail in Lake Elsinore, California. The purpose of the VMT screening is to evaluate if the project screens out from needing to conduct a detailed VMT analysis based on the City of Lake Elsinore (City) Traffic Impact Analysis Preparation Guide, adopted June 23, 2020. The memorandum supplements our Traffic Impact Analysis report developed for your proposed development.

PROJECT DESCRIPTION

The project is a gas station with convenience store and automated car wash development. It has 18 fueling positions and an automated car wash with a gross floor area (GFA) of 4,400 square feet (sf). The proposed project is anticipated be constructed and fully operational by year 2023.

TRIP GENERATION

The Institute of Transportation Engineers (ITE) has produced an informational report called Trip Generation. This document is used as a tool for estimating the number of vehicle trips generated for a particular land use. STE was directed to use Land Use Code: 960 (Super Convenience Market / Gas Station) for the convenience market and gas station part of the development and Land Use Code: 948 (Automated Car Wash) for the automated car wash part of the development. These values were approved as part of the Scoping Agreement with the City and developer. Table 1 presents the trip generation average rates for the independent variables of GFA and Vehicle Fueling Positions (VFP). The trips for the AM and PM peak hours typically coincide with the peak hour of the adjacent street (i.e., 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM). Table 2 presents the approved number of trips for the day, AM Peak Hour, and the PM Peak Hour. From the analysis, this site would generate the 1,919 net trips per day, 207 net trips during the AM Peak Hour, and 210 net trips during the PM Peak Hour.

Table 1. Trip Generation Rates for Project.

				Daily			AM Peak Hour			PM Peak Hour		
Independent Variable		Land Use		Trips / Independent Variable	% Enter	% Exit	Trips / Independent Variable	% Enter	% Exit	Trips / Independent Variable	% Enter	% Exit
18	VFP	Super Convenience Market/Gas Station	960	230.52	50%	50%	28.08	50%	50%	22.96	50%	50%
4,400	GFA	Automated Car Wash	948	900 ^[a]	50% ^[a]	50% ^[a]	36 ^[a]	50% ^[a]	50% ^[a]	14.20	50%	50%

^[a] Values taken from SANDAG Not So Brief Guide of Vehicular Traffic Generation Rates for Daily and AM Peak Hour.

Table 2. Trip Generation Summary for Project.

				Daily			AM Peak Hour			PM Peak Hour		
Independent Variable		Land Use		Trips	Enter	Exit	Trips	Enter	Exit	Trips	Enter	Exit
18	VFP	Super Convenience Market/Gas Station	960	4,150	2,075	2,075	505	253	252	414	207	207
4,400	GFA	Automated Car Wash	948	900 ^[a]	450 ^[a]	450 ^[a]	36 ^[a]	18 ^[a]	18 ^[a]	62	31	31
Total Trips Generated				5,050	2,525	2,525	541	271	270	476	238	238
Pass-By Trips		Pass-By Percentage (62% AM/Daily, 56% PM) ^[b]		-3,131	-1,566	-1,565	-335	-168	-167	-267	-134	-133
Net Trips				1,919	959	960	206	103	103	209	104	105

^[a] Values taken from SANDAG Not So Brief Guide of Vehicular Traffic Generation Rates for Daily and AM Peak Hour.

^[b] There are no pass-by percentages for Land Use 960 in the ITE Trip Generation Handbook, 3rd Edition, 2017. The closest land use would be Land Use 945 Gasoline/Service Station with Convenience Market. Pass-by rate was applied to total trips generated.

VMT BACKGROUND

California Senate Bill 743 (SB 743) directs the Governor's Office of Planning and Research (OPR) to amend the California Environmental Quality Act (CEQA) Guidelines for evaluating transportation impacts to provide alternatives to Level of Service that "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." In December 2018, the California Natural Resources Agency certified and adopted the updated CEQA Guidelines package. The amended CEQA Guidelines, specifically Section 15064.3, recommend the use of VMT as the primary metric for the evaluation of transportation impacts associated with land use and transportation projects. In general terms, VMT quantifies the amount and distance of automobile travel attributable to a project or region. All agencies and projects State-wide are required to utilize the updated CEQA guidelines recommending use of VMT for evaluating transportation impacts as of July 1, 2020. The updated CEQA Guidelines allow for lead agency discretion in establishing methodologies and thresholds provided there is substantial evidence to demonstrate that the established procedures promote the intended goals of the legislation. Where quantitative models or methods are unavailable, Section 15064.3 allows agencies to assess VMT qualitatively using factors such as availability of transit and proximity to other destinations.

VMT ASSESSMENT AND SCREENING

The City TIA guidelines include screening criteria for when a project is expected to cause a less than significant impact without conducting more detailed, project-level VMT assessment. STE used the Western Riverside Council of Governments (WRCOG) VMT Screening Tool located at <https://apps.fehrandpeers.com/WRCOGVMT/>. Please see Attachment 1 with the output from the screening tool. The City established three types of project screening that lead agencies can apply to effectively screen projects from project-level assessment. These screening criteria are summarized below.

TRANSIT PRIORITY AREA (TPA) SCREENING

A TPA is defined as a half-mile area around an existing major transit stop or an existing stop along a high-quality transit corridor. This presumption may not apply if the project:

- 1) Has a total Floor Area Ratio (FAR) of less than 0.75;
- 2) Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- 3) Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- 4) Replaces affordable residential units with a smaller number of moderate or high income residential units.

STE: The WRCOG VMT screening tool has been used to determine project type screening for this screening criteria. Based on the WRCOG VMT screening tool, the proposed project is not located within a TPA. However, the proposed project is located near nine bus stops with 0.5 miles along Mission Trail for Riverside Transit Authority (RTA) Route 8.

LOW VMT AREA SCREENING

Residential and office projects located within a low VMT-generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition, other employment-related and mixed-use land use projects may qualify for the use of screening if the project can reasonably be expected to generate VMT per service population that is similar to the existing land uses in the low VMT area.

For this screening in the WRCOG area, the RIVTAM travel-forecasting model was used to measure VMT performance for individual jurisdictions and for individual traffic analysis zones (TAZs). TAZs are geographic polygons similar to Census block groups used to represent areas of homogenous travel behavior. Total daily VMT per service population (population plus employment) was estimated for each TAZ. This presumption may not be appropriate if the project land uses would alter the existing built environment in such a way as to increase the rate or length of vehicle trips.

STE: Based on the WRCOG VMT Screening Tool, the proposed project is not located within a low VMT-generating TAZ based on Total VMT. However, the screening tool does indicate that the project is located within a low VMT-generating TAZ based on Residential Home-Based VMT and Home-Based Work VMT.

PROJECT TYPE SCREENING

Local serving retail projects less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. Local serving retail generally improves the convenience of shopping close to home and has the effect of reducing vehicle travel.

In addition to local serving retail, the following uses can also be presumed to have a less than significant impact absent substantial evidence to the contrary as their uses are local serving in nature:

- Local-serving K-12 schools
- Local parks
- Day care centers
- Local-serving gas stations

- Local-serving banks
- Local-serving hotels (e.g. non-destination hotels)
- Student housing projects
- Local serving community colleges that are consistent with the assumptions noted in the RTP/SCS
- Projects generating less than 110 daily vehicle trips per California OPR VMT Guidance

STE: The City's TIA preparation guide indicates that projects serving the local community less than 50,000 sf may be presumed to have a less than significant impact. In addition, it is also meets the criteria of a local-serving gas station. Therefore the proposed project satisfies the project type screening criteria and may be presumed to result in less than significant VMT impact.

CLOSING REMARKS

This memorandum provides an overview of the VMT analysis for the proposed project for consistency with the CEQA guidelines using the WRCOG VMT Screening Tool. The proposed project is located within a low VMT-generating TAZ based on Residential Home-Based VMT and Home-Based Work VMT. In addition, the proposed project is serving a local community as a "local –serving gas station" with a size of less than 50,000 sf can be presumed to have a less than significant VMT impact.

If you have any questions or require additional information, please feel free to contact me by phone at 949-527-2638 or by email at sirous@ste-group.com should you have any questions.

Best regards,



Sirous Alavi, Ph.D., P.E., PTOE
President

Attachment 1

