Appendix I

Traffic Impact Analysis

TRAFFIC IMPACT ANALYSIS

For

SOLANA 101

Prepared for the

CITY OF SOLANA BEACH

&

ZEPHYR PARTNERS

CLIENT REVIEW DRAFT: **October 9, 2017**

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1.0 EXECUTIVE SUMMARY

Urban Systems Associates, Inc. (USAI) was retained by Zephyr Partners to determine potential transportation impacts and appropriate mitigation measures for the development of Solana 101. The proposed project is located on an approximately 1.91 acre parcel of land on the north side of Dahlia Drive bound by Highway 101 to the east and Sierra Avenue to the west in the City of Solana Beach.

The proposed project is a mixed-use development consisting of:

- 25 Apartments
- 45,632 square feet of Standard Commercial Office
- 3,000 square feet of High Turnover Restaurant
- 9,204 square feet of Quality Restaurant
- 5,331 square feet of Retail

The proposed project is expected to generate 2,676 average daily trips (ADT) with 194 (146 in / 48 out) trips in the AM peak hour and 263 (117 in / 146 out) trips in the PM peak hour using driveway rates. The existing uses on-site generate 31 ADT with 4 (4 in / 0 out) trips in the AM peak hour and 4 (1 in / 3 out) trips in the PM peak hour using driveway rates. Where appropriate, transit and mixed-use credits were taken using methods from the ITE *Trip Generation Handbook*, 3rd Edition. After transit, mixed-use, and existing use credits were applied, the Net New Trips for the proposed project is expected to generate 1,930 ADT with 140 (112 in / 28 out) trips in the AM peak hour and 204 (92 in / 112 out) trips in the PM peak hour. For a detailed summary of the trip generation and credits taken, refer to Section 3.0 of this report.

In order to determine a scope of work for the Transportation Impact Study, staff of Urban Systems Associates, Inc. (USAI) used the regional SANTEC / ITE guidelines in coordination with staff from the City of Solana Beach. This effort resulted in a study area consisting of (6) roadway segments and seven (7) intersections, including two driveways.

The traffic generation of the Project was estimated based on trip generation rates from the *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, April 2002. The addition of project traffic was evaluated in Existing, Near Term, and Horizon Year 2035 scenarios, and an impact analysis was completed in which six scenarios were analyzed. The following scenarios were included in the report:

- Existing
- Existing With Project
- Near Term Without Project
- Near Term With Project
- Horizon Year 2035 Without Project
- Horizon Year 2035 With Project

The term "Near Term" is meant to discuss a condition occurring at the project's opening day where traffic from other known development projects in the area is added onto existing traffic levels. This reflects the best information available for determining what traffic would be in the next several years. The term "Horizon Year 2035" is meant to discuss traffic conditions in the Year 2035. The analysis year used for modeling purposes is the Year 2035.

Study Results:

Based upon this transportation impact analysis, it was determined that development of the proposed project would have the following impacts:

Impacts:

Street Segments – The proposed project is expected to have no direct project impacts to street segments in the Existing With Project scenario as shown in **Table 1-1**. The proposed project has no direct project impacts in the Near Term With Project scenario as shown in **Table 1-2**. The proposed project is expected to have no significant cumulative project impacts in the Year 2035 With Project scenario as shown in **Table 1-3**. For the segment of Via de la Valle east of Cedros Ave. the segment was analyzed in more detail using the peak hour arterial analysis (mirrors HCM 2000 arterial LOS methodology) the resulting LOS was D or better in all studied conditions. Peak hour arterial analysis can be found in **Appendix K**.

Intersections – As shown in **Table 1-4**, the project is expected to have no direct project impacts to intersections in the Existing With Project scenario. In **Table 1-5**, the project is expected to have no cumulative significant project impacts in the Near Term With Project scenario. The proposed project is expected to have no significant cumulative intersection impacts in the Year 2035 With Project scenario as shown in **Table 1-6**.

TABLE 1-1

Existing Without and Existing With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Existing			Existing + Project			ΔV/C	Is this impact Significant?
					LOS	Volume	V/C	LOS	Volume	V/C		
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	4	40,000	4-M	B	18,127	0.45	B	18,719	0.47	0.015	***NO***
	Dahlia Drive to Via De La Valle	4	40,000	4-M	B	18,604	0.47	B	19,545	0.49	0.024	***NO***
Dahlia Drive	Sierra Avenue to Highway 101	2	8,000	2-Cc	A	2,405	0.30	C	4,295	0.54	0.236	***NO***
Sierra Avenue	Plaza Street to Dahlia Drive	2	8,000	2-Cd	C	3,966	0.50	C	4,074	0.51	0.013	***NO***

Legend:

Class. = Functional Class

Cap. = Capacity

V/C.= Volume/ Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property)

2-Cd = 2 Lane Collector (multi-family)

M = 2 lane major arterial adjusted capacity for number of lanes.

4-M = 4 lane major arterial

Existing Without and Existing With Project Arterial Comparison

Road	Segment	Direction	Existing				Existing + Project				ΔSpeed (mph) AM	ΔSpeed (mph) PM	Is this impact Significant?
			AM		PM		AM		PM				
			Speed	LOS	Speed	LOS	Speed	LOS	Speed	LOS			
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	18.8	C	16.7	D	18.7	C	16.7	D	0.1	0.0	***NO***
		Westbound	21.7	C	20.5	C	21.7	C	20.5	C	0.0	0.0	***NO***

Legend:

LOS= Level of Service

TABLE 1-2

Near Term Without and Near Term With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Near Term			Near Term + Project			ΔV/C	Is this impact Significant?
					LOS	Volume	V/C	LOS	Volume	V/C		
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	4	40,000	4-M	B	18,127	0.45	B	18,719	0.47	0.015	***NO***
	Dahlia Drive to Via De La Valle	4	40,000	4-M	B	18,604	0.47	B	19,545	0.49	0.024	***NO***
Dahlia Drive	Sierra Avenue to Highway 101	2	8,000	2-Cc	A	2,405	0.30	C	4,295	0.54	0.236	***NO***
Sierra Avenue	Plaza Street to Dahlia Drive	2	8,000	2-Cd	C	4,070	0.51	C	4,177	0.52	0.013	***NO***

Legend:

Class. = Functional Class
Cap. = Capacity
V/C. =Volume/Capacity
LOS = Level of Service
2-Cc = 2 Lane Collector (w/ commercial-industrial property)
2-Cd = 2 Lane Collector (multi-family)
M = 2 lane major arterial adjusted capacity for number of lanes.
4-M = 4 lane major arterial

Near Term Without and Near Term With Project Arterial Comparison

Road	Segment	Direction	Near Term				Near Term + Project				ΔSpeed (mph) AM	ΔSpeed (mph) PM	Is this impact Significant?
			AM		PM		AM		PM				
			Speed	LOS	Speed	LOS	Speed	LOS	Speed	LOS			
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	18.4	C	16.4	D	18.3	C	16.4	D	0.1	0.0	***NO***
		Westbound	21.9	C	20.6	C	21.9	C	20.6	C	0.0	0.0	***NO***

Legend:

LOS= Level of Service

TABLE 1-3

Year 2035 Without and Year 2035 With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Year 2035			Year 2035 + Project			Δ V/C	Is this impact Significant?
					LOS	Volume	V/C	LOS	Volume	V/C		
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	4	40,000	4-M	C	22,500	0.56	C	23,092	0.58	0.015	***NO***
	Dahlia Drive to Via De La Valle	4	40,000	4-M	C	26,600	0.67	C	27,541	0.69	0.024	***NO***
Dahlia Drive	Sierra Avenue to Highway 101	2	8,000	2-Cc	C	4,400	0.55	D	6,290	0.79	0.236	***NO***
Sierra Avenue	Plaza Street to Dahlia Drive	2	8,000	2-Cd	C	4,700	0.59	C	4,808	0.60	0.013	***NO***

Legend:

Class. = Functional Class
Cap. = Capacity
V/C.= Volume/Capacity
LOS = Level of Service
2-Cc = 2 Lane Collector (w/ commercial-industrial property)
2-Cd = 2 Lane Collector (multi-family)
M = 2 lane major arterial adjusted capacity for number of lanes.
4-M = 4 lane major arterial

Year 2035 Without and Year 2035 With Project Arterial Comparison

Road	Segment	Direction	Year 2035				Year 2035 + Project				Δ Speed (mph) AM	Δ Speed (mph) PM	Is this impact Significant?
			AM		PM		AM		PM				
			Speed	LOS	Speed	LOS	Speed	LOS	Speed	LOS			
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	16.8	D	15.4	D	16.8	D	15.4	D	0.0	0.0	***NO***
		Westbound	21.8	C	20.6	C	21.8	C	20.6	C	0.0	0.0	***NO***

Legend:

LOS= Level of Service

TABLE 1-4

Existing Without and Existing With Project Intersection Comparison

#	Intersection	Existing				Existing + Project							
		AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
		D	LOS	D	LOS	D	LOS			D	LOS		
1	Highway 101 / Lomas Santa Fe Dr.	33.9	C	41.3	D	34.1	C	0.2	No	41.8	D	0.5	No
2	Cedros Ave. / Lomas Santa Fe Dr.	24.3	C	23.7	C	24.5	C	0.2	No	23.8	C	0.1	No
3	Sierra Ave. / Dahlia Dr.	8.0	A	8.3	A	8.1	A	0.1	No	8.4	A	0.1	No
4	Highway 101 / Dahlia Dr.	7.2	A	9.0	A	11.3	B	4.1	No	15.1	B	6.1	No
5	Highway 101 / Via de la Valle	31.0	C	35.9	D	31.0	C	0.0	No	50.0	D	14.1	No
A	Sierra Ave. / Project Drwy. A	(1)	(1)	(1)	(1)	0.4	A	N/A	No	0.1	A	N/A	No
B	Dahlia Dr. / Project Drwy. B	(1)	(1)	(1)	(1)	1.0	A	N/A	No	3.4	A	N/A	No

Notes:

LOS = Level of Service
Δ = Change
S = Significant
D= Delay
(1) = Current access to be redesigned with proposed project

TABLE 1-5

Near Term Without and Near Term With Project Intersection Comparison

#	Intersection	Near Term				Near Term + Project							
		AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
		D	LOS	D	LOS	D	LOS			D	LOS		
1	Highway 101 / Lomas Santa Fe Dr.	35.4	D	43.5	D	37.1	D	1.7	No	43.9	D	0.4	No
2	Cedros Ave. / Lomas Santa Fe Dr.	24.3	C	23.8	C	25.5	C	1.2	No	23.8	C	0.0	No
3	Sierra Ave. / Dahlia Dr.	8.1	A	8.5	A	8.2	A	0.1	No	8.6	A	0.1	No
4	Highway 101 / Dahlia Dr.	9.3	A	9.8	A	11.3	B	2.0	No	17.0	B	7.2	No
5	Highway 101 / Via de la Valle	38.6	D	44.7	D	39.0	D	0.4	No	54.2	D	9.5	No
A	Sierra Ave. / Project Drwy. A	(1)	(1)	(1)	(1)	0.4	A	N/A	No	0.1	A	N/A	No
B	Dahlia Dr. / Project Drwy. B	(1)	(1)	(1)	(1)	1.0	A	N/A	No	3.4	A	N/A	No

Notes:

LOS = Level of Service
Δ = Change
S = Significant
D= Delay
(1) = Current access to be redesigned with proposed project

TABLE 1-6

Year 2035 Without and Year 2035 With Project Intersection Comparison

#	Intersection	Year 2035				Year 2035 + Project							
		AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
		D	LOS	D	LOS	D	LOS			D	LOS		
1	Highway 101 / Lomas Santa Fe Dr.	47.6	D	69.9	E	52.8	D	5.2	No	70.4	E	0.5	No
2	Cedros Ave. / Lomas Santa Fe Dr.	24.6	C	23.8	C	39.3	D	14.7	No	35.0	C	11.2	No
3	Sierra Ave. / Dahlia Dr.	8.2	A	9.2	A	8.3	A	0.1	No	9.4	A	0.2	No
4	Highway 101 / Dahlia Dr.	12.5	B	10.0	B	19.0	B	6.5	No	17.9	B	7.9	No
5	Highway 101 / Via de la Valle	40.6	D	45.0	D	41.4	D	0.8	No	46.6	D	1.6	No
A	Sierra Ave. / Project Drwy. A	(1)	(1)	(1)	(1)	0.4	A	N/A	No	0.1	A	N/A	No
B	Dahlia Dr. / Project Drwy. B	(1)	(1)	(1)	(1)	1.0	B	N/A	No	3.3	A	N/A	No

Notes:

LOS = Level of Service
Δ = Change
S = Significant
D= Delay in seconds
(1) = Current access to be redesigned with proposed project

2.0 INTRODUCTION

Urban Systems Associates, Inc. (USAI) was retained by Zephyr Partners to determine potential transportation impacts and appropriate mitigation measures for the development of Solana 101. The proposed project is located on an approximately 1.91 acre parcel of land on the north side of Dahlia Drive bound by Highway 101 to the east and Sierra Avenue to the west in the City of Solana Beach. See **Figure 2-1**.

The proposed project is a mixed-use development consisting of:

- 25 Apartments
- 45,632 square feet of Standard Commercial Office
- 3,000 square feet of High Turnover Restaurant
- 9,204 square feet of Quality Restaurant
- 5,331 square feet of Retail

The proposed project is expected to generate 2,676 average daily trips (ADT) with 194 (146 in / 48 out) trips in the AM peak hour and 263 (117 in / 146 out) trips in the PM peak hour using driveway rates. The existing uses on-site generate 31 ADT with 4 (4 in / 0 out) trips in the AM peak hour and 4 (1 in / 3 out) trips in the PM peak hour using driveway rates. Where appropriate, transit and mixed-use credits were taken using methods from the ITE *Trip Generation Handbook*, 3rd Edition. After transit, mixed-use, and existing use credits were applied, the Net New Trips for the proposed project is expected to generate 1,930 ADT with 140 (112 in / 28 out) trips in the AM peak hour and 204 (92 in / 112 out) trips in the PM peak hour. For a detailed summary of the trip generation and credits taken, refer to Section 3.0 of this report. **Figure 2-2** shows the proposed project site plan. For study area purposes, USAI used Regional

guidelines that 50 trips in one direction during a peak hour be used as a threshold to determine study intersections and street segments. **Figure 2-3** shows the study area boundary and the intersection key selected for the study. USAI then obtained counts of the existing ADT and peak hour traffic flow data for the study intersections and street segments on August 3, 2016. **Table 2-1** lists the study area street segments and intersections.

FIGURE 2-1

Project Location Map

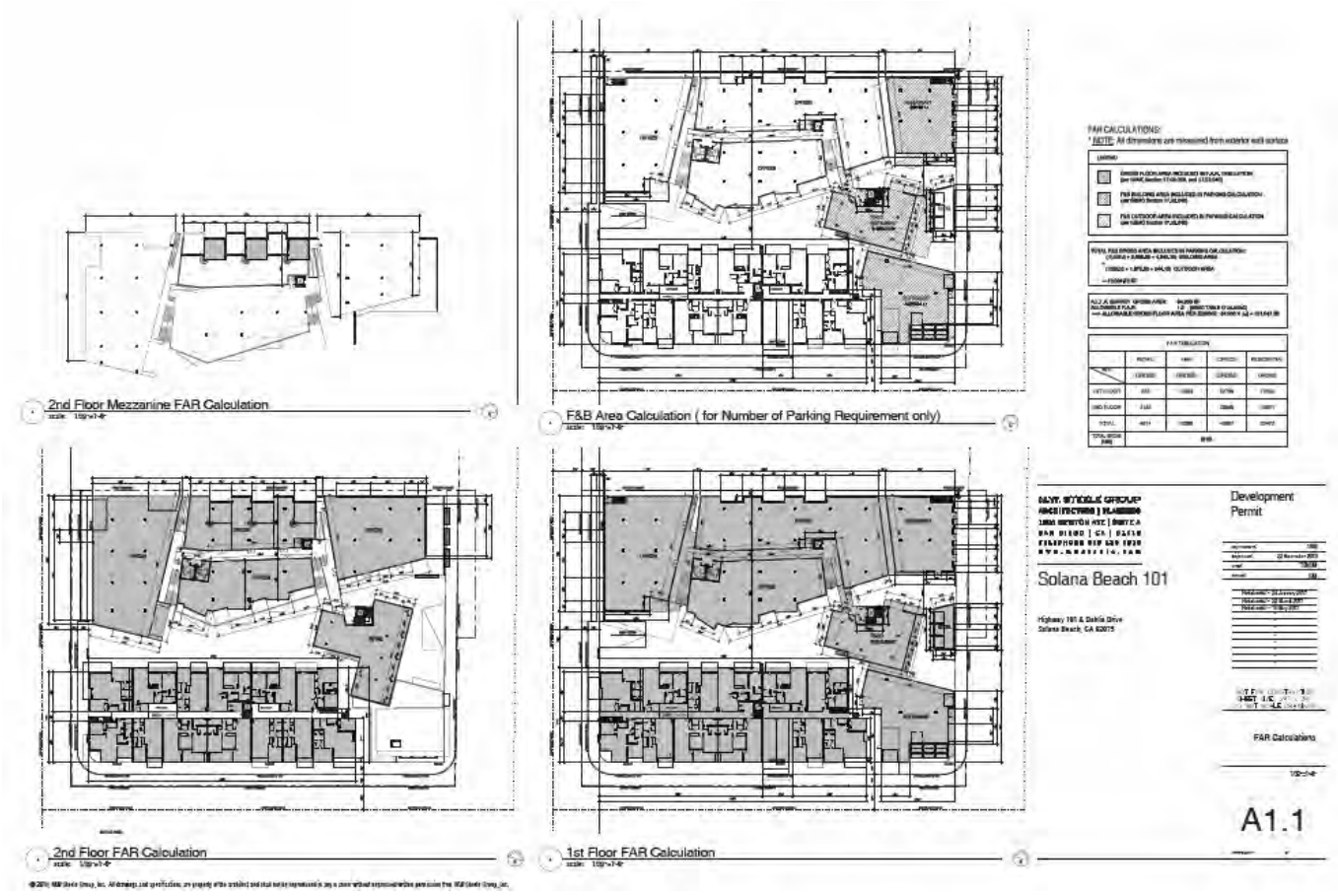


FIGURE 2-2

Project Site Plan

FIGURE 2-3

Study Area Boundary / Intersection Key

In order to summarize project impacts and required mitigation, this report is divided into the following text sections:

1.0 Executive Summary

2.0 Introduction

3.0 Proposed Project

4.0 Methodology

5.0 Existing Conditions

6.0 Existing With Project

7.0 Other Projects

8.0 Near Term Without Project

9.0 Near Term With Project

10.0 Horizon Year 2035 Without Project

11.0 Horizon Year 2035 With Project

12.0 Parking

13.0 Conclusions and Recommendations

14.0 References

15.0 Urban Systems Associates, Inc., Preparers

TABLE 2-1

Study Area Street Segments and Intersections

Street Segments	
Road	**Segment**
Highway 101	Lomas Santa Fe Drive to Dahlia Drive
	Dahlia Drive to Via De La Valle
Dahlia Drive	Sierra Avenue to Highway 101
Via de la Valle*	Highway 101 to Jimmy Durante Boulevard
Sierra Avenue	Plaza Street to Dahlia Drive

*Analyzed with a Peak Hour Arterial Analysis (results can be found in **Appendix K**)

Intersections	
Number	**Intersection**
1	Highway 101 / Lomas Santa Fe Dr.
2	Cedros Ave. / Lomas Santa Fe Dr.
3	Sierra Ave. / Dahlia Dr.
4	Highway 101 / Dahlia Dr.
5	Highway 101 / Via de la Valle
A	Sierra Ave. / Project Driveway A
B	Dahlia Dr./ Project Driveway B

3.0 PROPOSED PROJECT

The proposed project is a mixed-use development consisting of 25 Apartments; 45,632 square feet of Standard Commercial Office; 3,000 square feet of High Turnover Restaurant; 9,204 square feet of Quality Restaurant; and 5,331 square feet of Retail.

3.1 TRIP GENERATION

USAI prepared a trip generation table in accordance with the standards of practice used in the San Diego Association of Governments' (SANDAG) *(Not So) Brief Guide of Vehicle Traffic Generation Rates*, April 2002, included in **Appendix A**. As shown in **Table 3-1-A**, the trip generation assumes mixed-use and transit credits. A transit reduction was applied to apartments only due to the proximity to the Solana Beach Train Station and commuter bus services provided by North County Transit District located on Highway 101, north of Dahlia Drive. For commercial office, both a mixed-use reduction as well as transit reductions were applied according to the ITE *Trip Generation Handbook* 3rd Ed. methodology. The retail and restaurant uses only received a mixed-use reduction. See **Appendix A** for transit and mixed-use reduction information. As shown in **Table 3-1-A**, the driveway trips with transit and mixed-use reductions is calculated to be 1,961 average daily trips (ADT) with 144 (116 in / 28 out) AM peak hour trips and 208 (93 in / 115 out) PM peak hour trips.

Existing land uses and trip generation is provided in **Table 3-1-B** which includes two office tenants of 840 square feet and 710 square feet respectively (total of 1,550 square feet office space). Some of the existing uses are no longer in operation. However, they present the "historical" use of the site and were not taken into account in the trip generation.

Table 3-1-C shows the driveway NET NEW TRIPS (Proposed – Existing) to be 1,930 ADT with 140 (112 in / 28 out) trips in the AM peak hour and 204 (92 in / 112 out) trips in the PM peak hour. Also included in this table are the primary and pass-by trips. Driveway trips are the total number of trips generated by the project. Primary trips are defined as the trips that go directly between the origin and the primary destination i.e. to and from the project. Pass-by trips are trips that are deviated from a roadway within the vicinity of the generator to access the project. These trips "pass-by" the project driveway while in route to a primary destination. These are existing trips in the community and are not new trips to the region. Driveway trips are the sum of primary trips and pass-by trips.

3.2 TRIP DISTRIBUTION AND ASSIGNMENT

Project only trip distribution percentages are based on a SANDAG Series 12 Select Zone Full Forecast Model dated August 2015. Two separate distributions were developed for the proposed project (commercial and residential). Residential distribution percentages were applied from driveway A and commercial distribution percentages were applied from driveway B. Refer to **Figure 3-1** for Residential distribution and **Figure 3-2** for Commercial distribution **Figure 3-3** shows the project average daily traffic distributed to the street system. AM/PM peak hour project only traffic volumes are shown in **Figure 3-4**. The SANDAG model for the proposed project can be found in **Appendix A**.

TABLE 3-1-A

Solana 101 Project Trip Generation

Use	Intensity	Rate[1]	ADT	AM*					PM*				
				Peak %	Vol.	In % : Out%	In	Out	Peak %	Vol.	In % : Out%	In	Out
Apartment	25 DU	6 /DU	**150**	8%	**12**	20% : 80%	**2**	**10**	9%	**14**	70% : 30%	**9**	**4**
Transit Reduction %[3]							3%	3%				3%	3%
Transit Reduction Subtotal			5		0		0	0		0		0	0
Mixed-Use Reduction %[2]							0%	20%				56%	75%
Mixed-Use Reduction Subtotal			58		2		0	2		8		5	3
Driveway Trips			**87**		**10**		**2**	**9**		**5**		**4**	**1**
Primary Trips(97%)			**85**		**9**		**2**	**9**		**5**		**4**	**1**
Pass-By Trips(3%)			**3**		**0**		**0**	**0**		**0**		**0**	**0**
Office Space	45,632 SF	20 /KSF	**913**	14%	**128**	90% : 10%	**115**	**13**	13%	**119**	20% : 80%	**24**	**95**
Transit Reduction %[3]							8%	8%				8%	8%
Transit Reduction Subtotal			74		10		9	1		10		2	8
Mixed-Use Reduction %[2]							9%	73%				5%	2%
Mixed-Use Reduction Subtotal			82		20		10	9		3		1	2
Driveway Trips			**756**		**98**		**96**	**2**		**106**		**21**	**85**
Primary Trips(96%)			**726**		**94**		**92**	**2**		**101**		**20**	**82**
Pass-By Trips(4%)			**30**		**4**		**4**	**0**		**4**		**1**	**3**
Restaurant (Sit Down - High Turnover)	3,000 SF	160 /KSF	**480**	8%	**38**	50% : 50%	**19**	**19**	8%	**38**	60% : 40%	**23**	**15**
Mixed-Use Reduction %[2]							35%	36%				12%	35%
Mixed-Use Reduction Subtotal			136		14		7	7		8		3	5
Driveway Trips (AM/PM)			**344**		**25**		**12**	**12**		**30**		**20**	**10**
Primary Trips(88/80)			**289**		**22**		**11**	**11**		**24**		**16**	**8**
Pass-By Trips(12/20)			**55**		**3**		**1**	**1**		**6**		**4**	**2**
Restaurant (Quality - Sit Down)	9,204 SF	100 /KSF	**920**	1%	**9**	60% : 40%	**6**	**4**	8%	**74**	70% : 30%	**52**	**22**
Mixed-Use Reduction %[2]							35%	36%				12%	35%
Mixed-Use Reduction Subtotal			250		3		2	1		14		6	8
Driveway Trips (AM/PM)			**671**		**6**		**4**	**2**		**60**		**45**	**14**
Primary Trips(88/80)			**590**		**5**		**3**	**2**		**48**		**36**	**11**
Pass-By Trips(12/20)			**80**		**1**		**0**	**0**		**12**		**9**	**3**
Retail	5,331 SF	40 /KSF	**213**	3%	**6**	60% : 40%	**4**	**3**	9%	**19**	50% : 50%	**10**	**10**
Mixed-Use Reduction %[2]							43%	40%				71%	53%
Mixed-Use Reduction Subtotal			111		**3**		2	1		12		7	5
Driveway Trips (AM/PM)			**103**		**4**		**2**	**2**		**7**		**3**	**5**
Primary Trips(85%)			**87**		**3**		**2**	**1**		**6**		**2**	**4**
Pass-By Trips(15%)			**15**		**1**		**0**	**0**		**1**		**0**	**1**
Proposed Project Trips													
Total Proposed Driveway Trips			**1,961**		**144**		**116**	**28**		**208**		**93**	**115**
Total Proposed Primary Trips			**1,777**		**136**		**110**	**26**		**184**		**78**	**106**
Total Proposed Pass-By Trips			**184**		**8**		**6**	**2**		**23**		**14**	**9**

(1) - Rates are used from SANDAG, "Not so Brief Guide of Vehicular Traffic Generation Rates for San Diego Region", April 2002.

(2) - Mixed Use Reductions are calculated using ITE Trip Generation Handbook 3rd Edition Spreadsheet Tool

(3) - Transit Reductions are used from ITE Trip Generation Handbook 3rd Edition Appendix E (Tables E.1 & E.2)

TABLE 3-1-B

Solana 101 Project Trip Generation

Use	Intensity	Rate*	ADT	AM						PM					
				Peak %	Vol.	In %	Out%	In	Out	Peak %	Vol.	In %	Out%	In	Out
Standard Commercial Office*	1,550 SF	20 /KSF	**31**	14%	**4**	90%	10%	**4**	**0**	13%	**4**	20%	80%	**1**	**3**
Primary Trips(96%)			**30**		**4**			**4**	**0**		**4**			**1**	**3**
Pass-By Trips(4%)			**1**		**0**			**0**	**0**		**0**			**0**	**0**

Source:

*Rates are used from SANDAG, "Not so Brief Guide of Vehicular Traffic Generation Rates for San Diego Region", April 2002.

Note:

ADT= Average Daily Trips

KSF = 1,000 Square Feet

VFS = Vehicle Fueling Station

DU = Dwelling Units

TABLE 3-1-C
Solana 101 Project Trip Generation

Land Use	ADT with Transit & Mixed-Use Redcutions	AM						PM					
		Peak %	Vol.	In %	Out%	In	Out	Peak %	Vol.	In %	Out%	In	Out
Apartment*	**87**	8%	**10**	20% : 80%		**2**	**9**	9%	**5**	70% : 30%		**4**	**1**
Primary Trips(97%)	**85**		**9**			**2**	**9**		**5**			**4**	**1**
Pass-By Trips(3%)	**3**		**0**			**0**	**0**		**0**			**0**	**0**
Office Space*	**756**	14%	**98**	90% : 10%		**96**	**2**	13%	**106**	20% : 80%		**21**	**85**
Primary Trips(96%)	**726**		**94**			**92**	**2**		**101**			**20**	**82**
Pass-By Trips(4%)	**30**		**4**			**4**	**0**		**4**			**1**	**3**
Restaurant (High Turnover)*(AM/PM)	**344**	8%	**25**	50% : 50%		**12**	**12**	8%	**30**	60% : 40%		**20**	**10**
Primary Trips(88/80)	**289**		**22**			**11**	**11**		**24**			**16**	**8**
Pass-By Trips(12/20)	**55**		**3**			**1**	**1**		**6**			**4**	**2**
Restaurant (Quality)*(AM/PM)	**671**	1%	**6**	60% : 40%		**4**	**2**	8%	**60**	70% : 30%		**45**	**14**
Primary Trips(88/80)	**590**		**5**			**3**	**2**		**48**			**36**	**11**
Pass-By Trips(12/20)	**80**		**1**			**0**	**0**		**12**			**9**	**3**
Retail* (AM/PM)	**103**	3%	**4**	60% : 40%		**2**	**2**	9%	**7**	50% : 50%		**3**	**5**
Primary Trips(85%)	**87**		**3**			**2**	**1**		**6**			**2**	**4**
Pass-By Trips(15%)	**15**		**1**			**0**	**0**		**1**			**0**	**1**
Proposed Trip Generation													
	ADT with Transit & Mixed-Use Reductions		**Vol.**			**In**	**Out**		**Vol.**			**In**	**Out**
Total Proposed Driveway Trips	**1,961**		**144**			**116**	**28**		**208**			**93**	**115**
Total Proposed Pass-By Trips	**184**		**8**			**6**	**2**		**23**			**14**	**9**
Total Proposed Primary Trips	**1,777**		**134**			**110**	**26**		**184**			**78**	**106**
Existing Trip Generation													
	ADT with Transit & Mixed-Use Reductions		**Vol.**			**In**	**Out**		**Vol.**			**In**	**Out**
Total Existing Driveway Trips	**31**		**4**			**4**	**0**		**4**			**1**	**3**
Total Existing Pass-By Trips	**30**		**4**			**4**	**0**		**4**			**1**	**3**
Total Existing Primary Trips	**1**		**0**			**0**	**0**		**0**			**0**	**0**
NET NEW TRIPS (Proposed - Existing)													
	ADT with Transit & Mixed-Use Reductions		**Vol.**			**In**	**Out**		**Vol.**			**In**	**Out**
Total Net Driveway Trips	**1,930**		**140**			**112**	**28**		**204**			**92**	**112**
Total Net Pass-By Trips	**154**		**4**			**2**	**2**		**20**			**14**	**6**
Total Net Primary Trips	**1,776**		**136**			**110**	**26**		**184**			**78**	**106**

Source:

*Rates are used from SANDAG, "Not so Brief Guide of Vehicular Traffic Generation Rates for San Diego Region", April 2002.

Note:

ADT= Average Daily Trips

KSF = 1,000 Square Feet

FIGURE 3-1

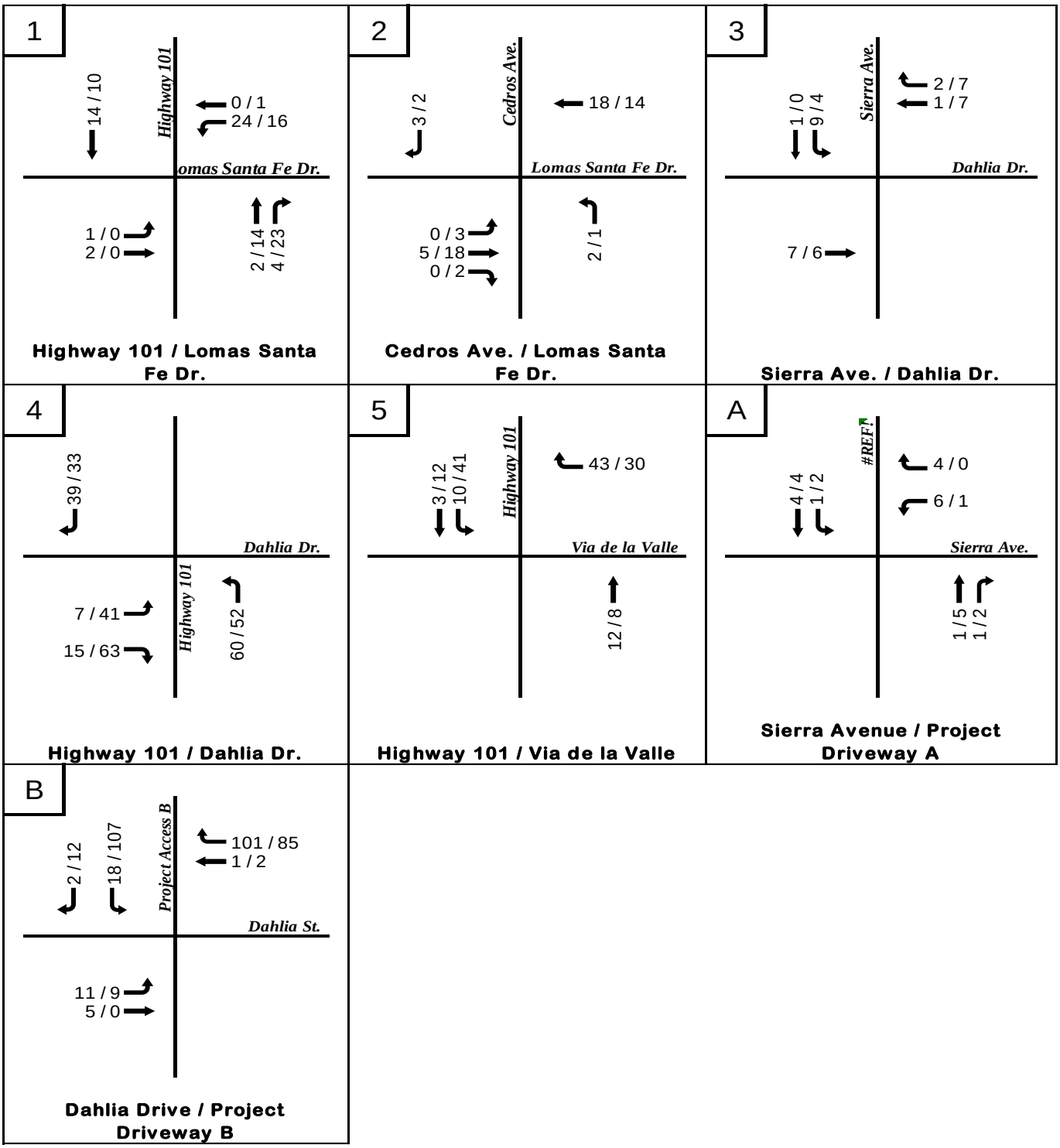
Project Distribution Percentages (Residential)

FIGURE 3-2

Project Distribution Percentages (Commercial)

FIGURE 3-3

Project Only Average Daily Traffic



XX / XX = AM / PM Peak hour volumes

FIGURE 3-4

Project Only AM / PM Peak Hour Traffic

4.0 METHODOLOGY

This section of the report describes various analysis procedures and criteria that are used to determine if the proposed project has a significant impact and if mitigation is required. Mitigation may be either specific improvements by the project for a direct or cumulative impact or a financial contribution toward an improvement by others if a cumulative impact occurs. Two criteria must be met before project mitigation is required. First, the intersection or street segment must be projected to operate at an unacceptable LOS after project trips are added (i.e., "E" or "F" as discussed below). Second, the amount of project traffic must be significant based on the application of criteria also discussed below. For an intersection, if the change in delay anticipated due to the project is greater than 2 seconds and the LOS is "E" or "F" respectively, then the project's intersection impacts would be considered significant. For a street segment, if the change in volume to capacity ratio (V/C ratio) anticipated due to the project exceeds 0.02, and the LOS is "E" or "F," respectively, then the project's street segment impact would be considered significant. If project traffic causes an intersection, roadway segment, or freeway segment to degrade from LOS "D" to LOS "E" or LOS "F," the project impact would be significant and project mitigation is required. For freeway segment impacts to be considered significant, the segment would need to operate at an unacceptable LOS and exceed a change in V/C ratio of 0.01 for LOS "E" and "F," respectively. A project ramp meter impact would be significant if the ramp meter calculations show 15 minutes of delay or greater and the change in delay due to the project is greater than 2 minutes and the freeway mainline segments are expected to operate at LOS "E" and "F," respectively, using the most restrictive meter rate method. For this study, the freeway criteria was not applicable because the project would not be expected to contribute 50 directional peak hour trips to I-5.

4.1 SANTEC/ITE GUIDELINES

The City of Solana Beach has adopted the SANTEC/ITE guidelines for traffic impact studies in the San Diego region. The SANTEC/ITE guidelines "attempt to consolidate regional efforts to identify when a TIS is needed, what professional procedures should be followed, and what constitutes a significant traffic impact".

The City's Significance Determination Thresholds (2011) establish criteria that identify the allowable change in delay or V/C ratio due to project impacts. This publication also establishes criteria for measuring project impacts at intersections. This method establishes an allowable increase in delay at intersections due to the addition of project trips. The SANTEC/ITE specifies use of the most current Highway Capacity Manual (HCM) operational method for studying intersections. For analyzing intersections, a software package called Synchro is used. This software package is a direct and faithful application of the HCM methodology.

4.2 TRIP DISTRIBUTION

Trip distribution is the process of determining traffic percentage splits on the regional and local roadway network. Trip distribution for the proposed project was based on a SANDAG Series 12 Select Zone Full Forecast Model dated August 2015. Distribution was applied to each driveway based on its specific use (commercial and residential).

4.3 STREET LOS THRESHOLD

When analyzing street segments, the LOS must be determined. LOS is a measure used to describe the conditions of traffic flow. LOS is expressed using letter designations from "A" to "F." LOS "A" represents the best case, and LOS "F" represents the worst case. Generally LOS "A" through "C" represents free-flowing traffic conditions with little or no delay. LOS "D" represents limited congestion and some delay. However, the duration of periods of delay is acceptable to most people. LOS "E" and "F" represent significant delays on local streets, which are generally unacceptable for urban design purposes. The LOS descriptions are from Chapter 9 of the HCM (Transportation Research Board 2000).

The SANTEC/ITE guidelines have developed LOS threshold tables based on the different functional street classifications and their ability to carry traffic. For the City of Solana Beach, LOS "D" is the acceptable LOS standard for roadways and intersections. Although SANTEC/ITE guidelines allow certain roadway segments to be analyzed using Average Daily Traffic (ADT) and roadway classifications, certain segments require a more detailed and accurate methodology. Roadway segments with large ADTs compared to other roadways with similar cross sections can sometimes require an enhanced and more detailed analysis to accurately reflect actual operation of the street. The SANTEC/ITE guidelines call for the use of HCM arterial methodologies as an alternative to the LOS table contained in Table 2. Due to the relatively high volumes on Via De La Valle, the roadway was analyzed using the peak hour analysis contained in Chapter 11 of the current HCM.

4.4 INTERSECTION LOS PROCEDURES

The City and SANTEC/ITE guidelines, as adopted by SANDAG (2006), determine the procedures to be used for intersection peak hour analysis. To determine an intersection peak hour LOS, the SANTEC/ITE guidelines require use of the most recent procedure from Chapter 9 of the HCM (Transportation Research Board 2000). The procedure in Chapter 9, which is used to analyze signalized intersections, is the "operational method." This method determines LOS based on average control delay expressed in seconds. **Table 4-1** shows the LOS based upon the delay. A computer program is used to complete the analysis. As discussed above, the City and SANTEC/ITE guidelines have established LOS "D" or better as the objective for intersections and street segments.

4.5 CMP ENHANCED CEQA REVIEW GUIDELINES

Federal Highway Administration 23 CFR 450.320 requires that each transportation management area (TMA) address congestion management through a process involving an analysis of multimodal metropolitan wide strategies that are cooperatively developed to foster safety and integrated management of new and existing transportation facilities eligible for federal funding.

SANDAG has be designated as the TMA for the San Diego region. The 2050 Regional Transportation Plan meets the requirements of 23 CFR 450.320 by incorporating the following federal congestion management process: performance monitoring and measurement of the regional transportation system, multimodal alternatives and non-SOV analysis, land use impact analysis, the provision of congestion management tools, and integration with the regional transportation improvement program process.

California State Proposition 111, passed by voters in 1990, established a requirement that urbanized areas prepare and regularly update a Congestion Management Program (CMP). The requirements within the State CMP were developed to monitor the performance of the transportation system, develop programs to address near-term and long-term congestion, and better integrate transportation and land use planning. SANDAG provided regular updates for the State CMP, and since this decision, SANDAG has been abiding by 23 CFR 450.320 to ensure the region's continued compliance with the federal congestion management process. Therefore, the City of Solana Beach has been exempted from the requirements of the State CMP.

TABLE 4-1

Level of Service Criteria for Signalized Intersections

Level of Service	Control Delay Per Vehicle (sec)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Source: Transportation Research Board 2000, Table 9-1

Level of Service Criteria for Un-signalized Intersections

Level of Service	Control Delay Per Vehicle (sec)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Source: Transportation Research Board 2000, Table 10-7

4.6 FREEWAY SEGMENT LOS PROCEDURES

To determine the LOS of main-lane freeway segments, a V/C analysis would be conducted consistent with California Department of Transportation (Caltrans) District 11 Procedures for Estimating Freeway Level of Service. This analysis study area does not include any freeway analysis so these procedures have not been utilized.

4.7 SIGNIFICANCE THRESHOLDS

As discussed above, two criteria must be met before project traffic mitigation is required. First, an unacceptable LOS (i.e., "E" or "F") must occur, and second, significance thresholds for only project traffic must be exceeded. Alternatively, if project traffic causes a facility to degrade from LOS "D" to "E," a significant impact would occur. The City's significance thresholds are summarized in **Table 4-2**. These thresholds are used in this analysis along with LOS to determine if project mitigation is required. **Table 4-3** shows the roadway classifications for the City of Solana Beach as defined in the SANTEC/ITE Guidelines, 2000.

TABLE 4-2

Significance Thresholds

Traffic Impact Significant Thresholds

Level of Service with Project[a]	Allowable Increase Due to Project Impacts[b]					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
D,E & F (or ramp meter delays above 15 minutes	0.01	1	0.02	1	2	2[c]

Footnotes:

a. All level of sevice measurements are based upon HCM procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However,ramp meter delays above 15 minutes are considered excessive.

b. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigations (within the Traffic Impact Study [TIS] report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note a above), or if the project adds a significant amount of peak hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

c. The impact is only considered significant if the total delay exceeds 15 minutes.

General Notes:

1. V/C =Volume to Capacity Ratio
2. Speed = Arterial speed measured in miles per hour
3. Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters
4. LOS = Level of Service

TABLE 4-3
Roadway Classifications

		Level of Service W/ ADT				
Street Classification	**Lanes**	**A**	**B**	**C**	**D**	**E**
Multi Modal Boulevard	4 Lanes	15,000	21,000	30,000	35,000	40,000
Commercial Bicycle Boulevard	2 Lanes	2,500	3,500	5,000	6,500	8,000
Local Street	2 Lanes	---	---	2,200	---	---

Notes:

1. Classifications were taken from the City of Solana Beach General Plan.
2. Capacities were derived from the SANTEC/ITE, *Guidelines for Traffic Impact Studies (TIS) In the San Diego Region*. The most comparable street classification category to the classifications in the City of Solana Beach General Plan were used.

5.0 EXISTING CONDITIONS

The proposed project is located on the north side of Dahlia Drive bound by Highway 101 to the east and Sierra Avenue to the west in the City of Solana Beach. See **Figure 2-1** for the project location.

5.1 EXISTING ROADWAY FACILITIES

Highway 101 – runs north/south and is constructed as a four lane divided roadway. It is classified as a four-lane Major Arterial within the project study area according to the City of Solana Beach General Plan Circulation Element. It has a raised median with select median breaks. Class II bike lanes are provided on both sides of the street. Parking is only allowed on the west side of the roadway. The posted speed limit is 45 MPH.

The Highway 101 Westside Improvement project has recently been completed between Dahlia Street and Cliff Street. This improvement project is assumed in the Existing and Near Term analysis. The project has shifted the center median along Highway 101 to the east to construct a wide sidewalk on the west side of Highway 101. A sharrow lane, shared by motorists and bicyclists, is now provided in the southbound direction. Due to the reduced vehicular capacity associated with sharrow lanes, Highway 101 between Dahlia Drive and Lomas Santa Fe Drive was analyzed as a Major Road with a reduced capacity of 35,000 ADT as opposed to 40,000 ADT. This capacity was derived based on the assumption that each Major Road lane has a capacity of 10,000 ADT. The two northbound lanes and the inside southbound lane retain their original Major Road capacity of 10,000 ADT. However, the outer southbound lane (now shared with bicyclists) is assumed to have half the capacity, or 5,000 ADT.

The City is pursuing an additional traffic calming project as a part of the Highway 101 Streetscape project that reduces Highway 101 from 4 lanes to 3 lanes. This project is assumed in the Year 2035 with and without project analysis.

Lomas Santa Fe Drive – runs east/west and is constructed as a four lane undivided roadway connecting Highway 101 and Interstate 5. According to the City of Solana Beach General Plan Circulation Element, this roadway is classified as a four lane Major Arterial within the project study area. Bike lanes are provided on both sides of the street with a posted speed limit of 35 MPH.

Dahlia Drive – runs east/west connecting Sierra Avenue and Highway 101. Dalia Drive is constructed as a two lane undivided roadway along the project frontage. According to the City of Solana Beach General Plan Circulation Element, Dahlia Drive is a non-classified local roadway. No bike lanes are provided on either side of the street.

Via De La Valle – runs east/west located in the City of Del Mar. It is functionally classified as a two lane Major roadway consistent with the EIR for the Del Mar Fairgrounds Master Plan (LSA Associates, Inc. October 2009), see **Appendix B**. This roadway also provides access to Interstate 5 to the east. Bike lanes are provided along both sides of the street with a posted speed limit of 45 MPH.

5.2 EXISTING TRAFFIC VOLUMES

Figure 5-1 shows the existing average weekday 24-hour traffic volumes for street segments in the project study area. Existing street segment functional classifications were used for purposes of this analysis.

Figure 5-2 shows the lane configurations for the existing roadway network at the project access and at intersections studied.

For conservative analysis, traffic counts were obtained and reviewed to account for the highest daily and peak hour traffic throughout the year. In this community, seasonal events such as the Del Mar Fair and Racetrack temporarily contribute the highest traffic volumes along Highway 101 and local streets. In order to ensure that existing volumes accounted for these seasonal events counts were taken in August of 2016. Traffic count worksheets are provided in **Appendix B**. Data was obtained from Caltrans Performance Measurement System (PeMS) and analyzed for a 3 month period from June to September of 2015. This data shows that August is the month with the highest traffic volumes along Highway 101. A graphical representation of this data is provided in **Appendix B**. The southbound graph data was obtained from Manchester Avenue, which is located north of the Del Mar Fairgrounds. The northbound graph data was obtained from Carmel Mountain Road, which is located south of the Del Mar Fairgrounds.

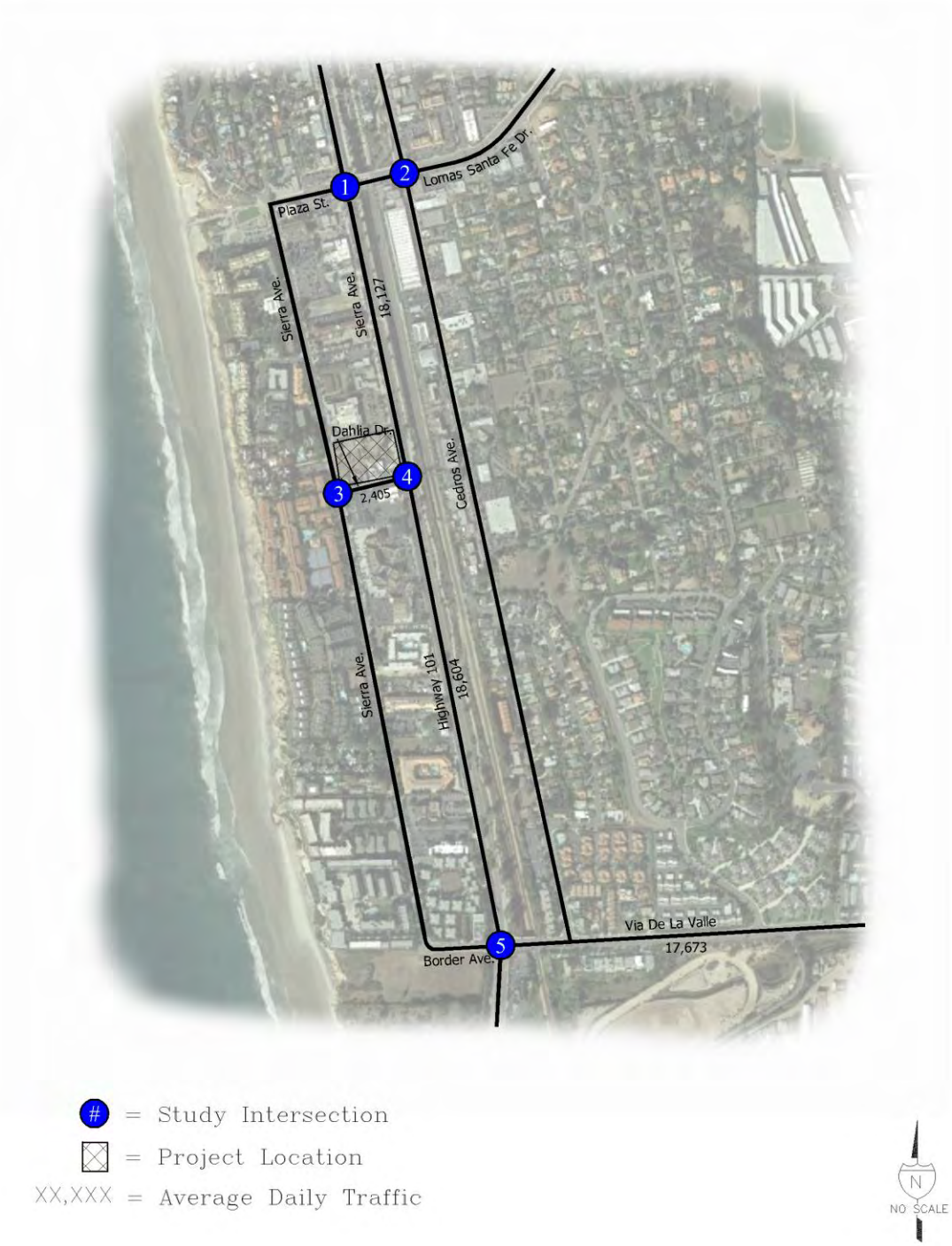


FIGURE 5-1

Existing Average Daily Traffic

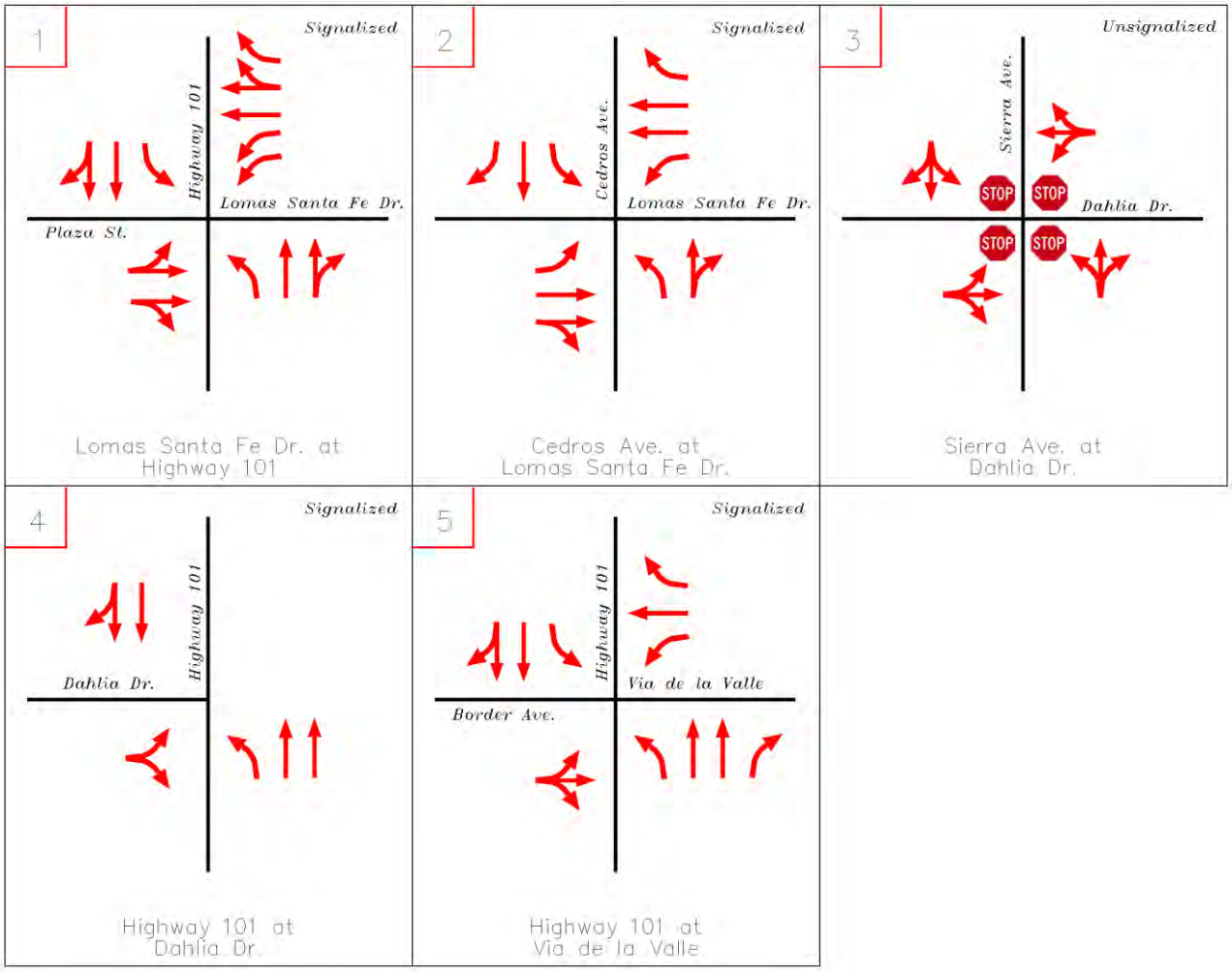


FIGURE 5-2

Existing Lane Configurations

5.3 STREET SEGMENT ANALYSIS

As shown on **Table 5-1**, all street segments are projected to operate at an acceptable LOS (D or Better) in the existing condition. Via de la Valle was analyzed using the peak hour analysis contained in Chapter 11 of the current HCM and the segment was found to operate at an acceptable LOS D or better.

5.4 EXISTING INTERSECTIONS

As previously discussed in Section 5.2, **Figure 5-2** shows the existing lane configurations for the intersections in the study area.

5.5 EXISTING INTERSECTION PEAK HOUR VOLUMES AND LOS

Figure 5-3 shows the existing AM and PM peak hour intersection traffic volumes. As required by the City of Solana Beach, the analysis of peak hour intersection performance was based on the 2000 HCM using operational analysis procedures. A computer program (Synchro), which is based on the HCM, was used to complete the analysis. As shown on **Table 5-2**, all intersections currently operate at a LOS "D" or better during the AM and PM peak hour periods. LOS calculation worksheets for existing conditions may be found in **Appendix C**.

TABLE 5-1

Existing Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	SD	4	4-M	40,000	18,127	0.45	B
	Dahlia Drive to Via De La Valle	SD	4	4-M	40,000	18,604	0.47	B
Dahlia Drive	Sierra Avenue to Highway 101	SD	2	2-Cc	8,000	2,405	0.30	A
Sierra Avenue	Plaza Street to Dahlia Drive	SD	2	2-Cd	8,000	3,966	0.50	C

Legend:

Class. = Functional Class

Cap. = Capacity

V/C. = Volume/ Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property)

2-Cd = 2 Lane Collector (multi-family)

M = 2 lane major arterial adjusted capacity for number of lanes.

4-M = 4 lane major arterial

Existing Street Segment Arterial Levels of Service

Road	Segment	Direction	Existing				Existing + Project				Δ Speed (mph) AM	Δ Speed (mph) PM	Is this impact Significant?
			AM		PM		AM		PM				
			Speed	LOS	Speed	LOS	Speed	LOS	Speed	LOS			
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	18.8	C	16.7	D	18.7	C	16.7	D	0.1	0.0	***NO***
		Westbound	21.7	C	20.5	C	21.7	C	20.5	C	0.0	0.0	***NO***

Legend:

LOS= Level of Service

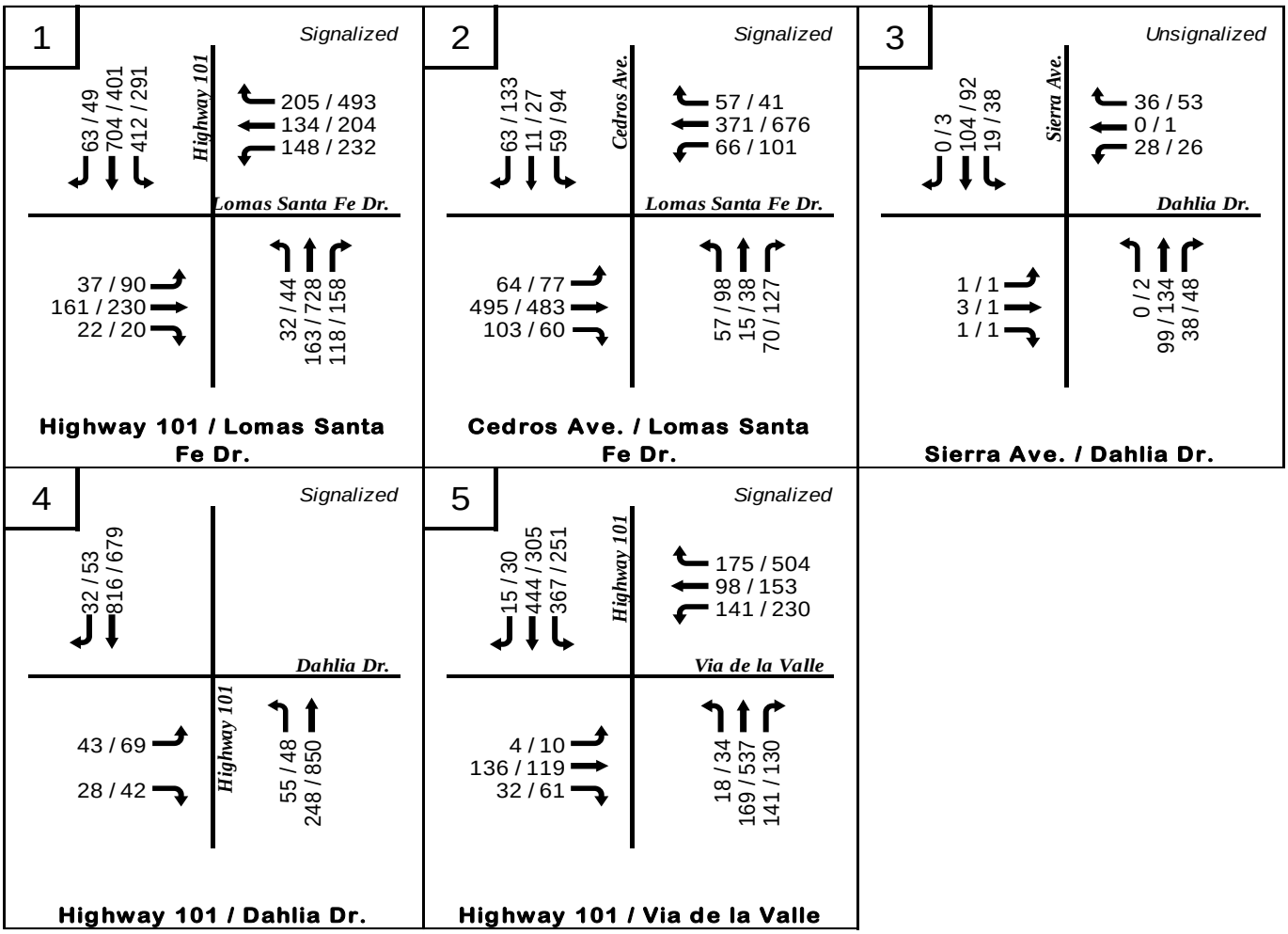


FIGURE 5-3

Existing AM/PM Peak Hour Traffic

TABLE 5-2

Existing Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Highway 101 / Lomas Santa Fe Dr.	Signalized	33.9	C	41.3	D
2	Cedros Ave. / Lomas Santa Fe Dr.	Signalized	24.3	C	23.7	C
3	Sierra Ave. / Dahlia Dr.	Unsignalized	8.0	A	8.3	A
4	Highway 101 / Dahlia Dr.	Signalized	7.2	A	9.0	A
5	Highway 101 / Via de la Valle	Signalized	31.0	C	35.9	D

Notes:

Delay = seconds per vehicle

LOS = Level of Service

6.0 EXISTING WITH PROJECT

The purpose of this chapter is to evaluate the impacts of the Existing with Project analysis. This analysis evaluates the project's "direct impacts" by comparing existing conditions without project to existing condition with the project. **Appendix D** includes the Existing with Project Synchro worksheets which is the basis for the following discussion.

6.1 STREET SEGMENTS

Street segments LOS with project traffic were determined by adding expected project only daily volumes to the existing daily volumes. **Figure 6-1** shows the Existing with Project average daily traffic volumes. **Table 6-1** shows street segment LOS with the addition of the Solana 101 project traffic. As shown, all study street segments are projected to operate at acceptable levels of service when project traffic is added to existing traffic. Via de la Valle was analyzed using the peak hour analysis contained in Chapter 11 of the current HCM and the segment was found to operate at an acceptable LOS D or better.

6.2 INTERSECTIONS

Project traffic for the AM and PM peaks were added to the existing traffic as shown in **Figure 6-2**. Intersection delays and LOS for the Existing with Project peak hour traffic is provided in **Table 6-2**. As shown, all intersections analyzed within the study area are projected to operate at acceptable LOS "D" or better.

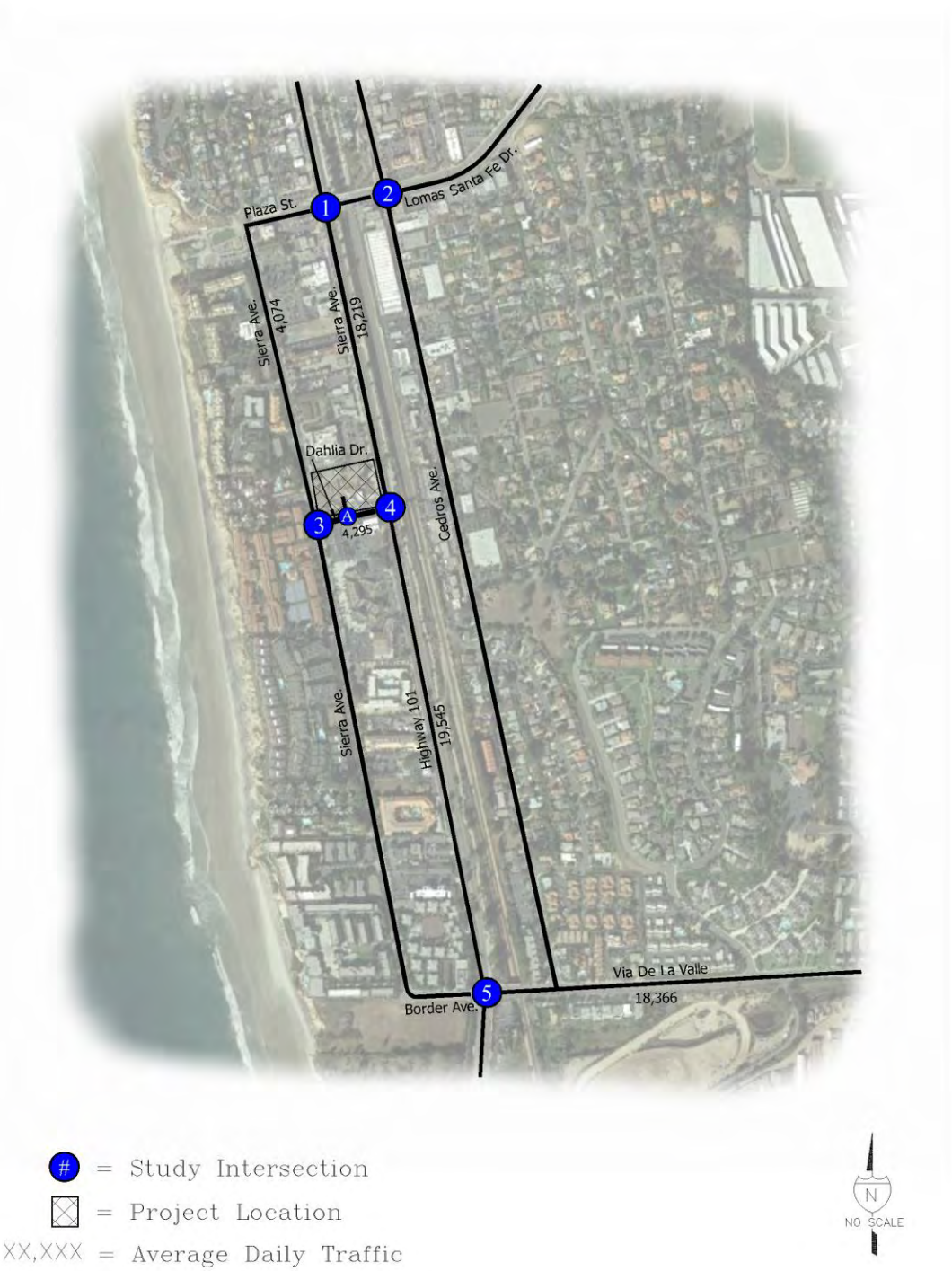


FIGURE 6-1

Existing + Project Average Daily Traffic

TABLE 6-1

Existing + Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	SD	4	4-M	40,000	18,719	0.47	B
	Dahlia Drive to Via De La Valle	SD	4	4-M	40,000	19,545	0.49	B
Dahlia Drive	Sierra Avenue to Highway 101	SD	2	2-Cc	8,000	4,295	0.54	C
Sierra Avenue	Plaza Street to Dahlia Drive	SD	2	2-Cd	8,000	4,074	0.51	C

Legend:

Class. = Functional Class

Cap. = Capacity

V/C. = Volume/Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property)

2-Cd = 2 Lane Collector (multi-family)

M = 2 lane major arterial adjusted capacity for number of lanes.

4-M = 4 lane major arterial

Existing + Project Arterial Levels of Service

Road	Segment	Direction	Arterial Speed (mph)		LOS	
			AM	PM	AM	PM
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	18.7	16.7	C	D
		Westbound	21.7	20.5	C	C

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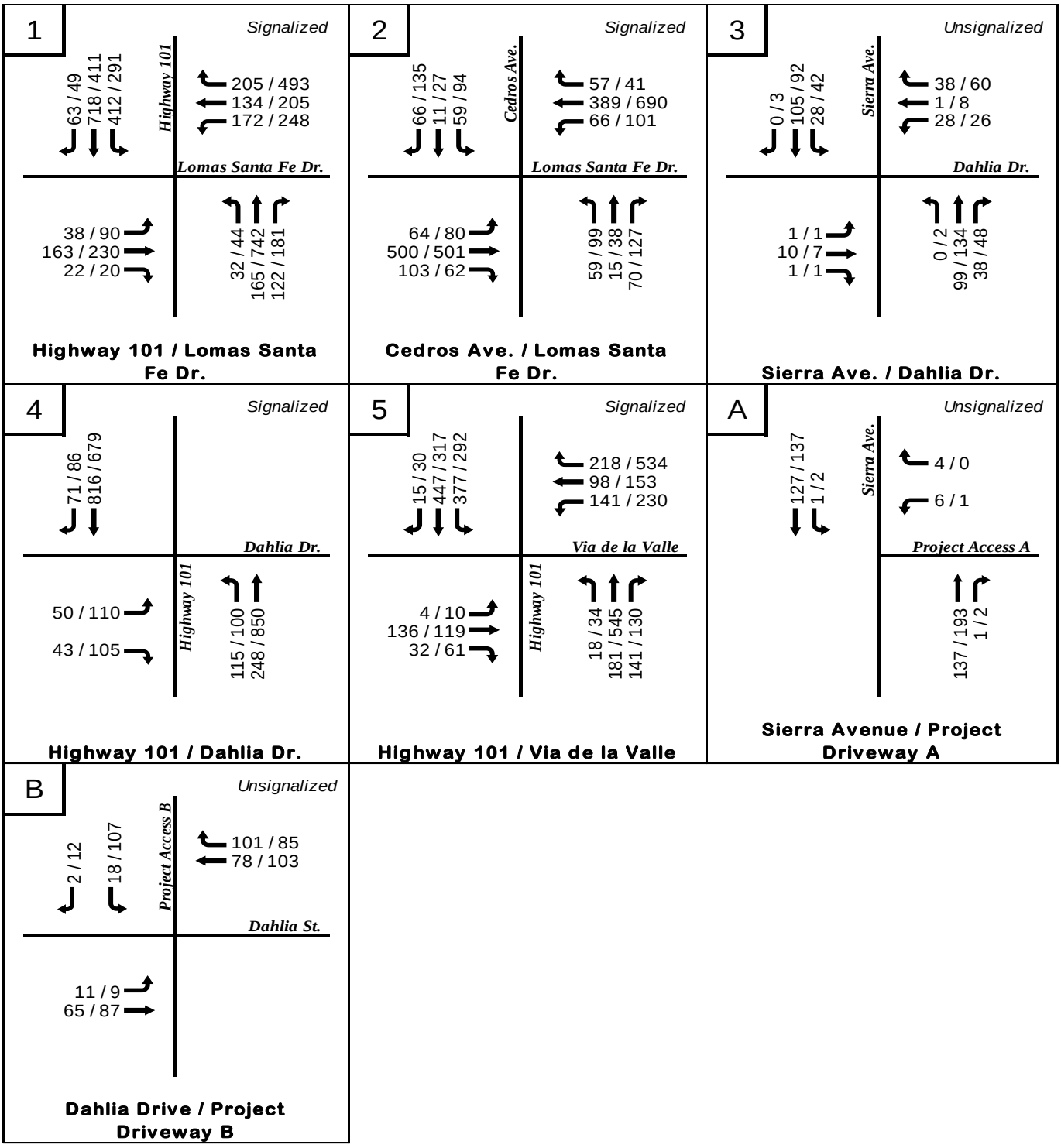


FIGURE 6-2

Existing + Project AM / PM Peak Hour Traffic

TABLE 6-2

Existing With Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Highway 101 / Lomas Santa Fe Dr.	Signalized	34.1	C	41.8	D
2	Cedros Ave. / Lomas Santa Fe Dr.	Signalized	24.5	C	23.8	C
3	Sierra Ave. / Dahlia Dr.	Unsignalized	8.1	A	8.4	A
4	Highway 101 / Dahlia Dr.	Signalized	11.3	B	15.1	B
5	Highway 101 / Via de la Valle	Signalized	31	C	50	D
A	Sierra Ave. / Project Drwy. A	Unsignalized	0.4	A	0.1	A
B	Dahlia Dr. / Project Drwy. B	Unsignalized	1	A	3.4	A

Notes:

Delay = seconds per vehicle

LOS = Level of Service

7.0 OTHER PROJECTS

To find the Near Term (Existing With Other Projects) traffic volumes, USAI consulted with City staff to determine other pending or recently approved projects that are expected to be completed and occupied, after the date of existing traffic counts but prior to the project's expected opening day that would contribute traffic within the project study area. The City found two (2) cumulative projects within Solana Beach that could contribute traffic to the project study area which are the Pearl project and the Cedros 330 project. Volumes from these projects were taken from their respective traffic studies. In addition to these projects, the analysis assumed a 5% growth (1% per year for 5 years) factor onto the seasonal existing traffic volumes to account for any unforeseen future "other" projects that may contribute traffic to the study area within the next five years.

The "other projects" daily and peak hour traffic volumes assumed in this analysis include the Pearl project, Cedros 330 project, and 5% growth of the seasonal existing traffic volumes. These volumes were added to the seasonal existing traffic volumes to obtain Near Term traffic volumes.

Figure 7-1 shows the other projects average daily traffic volumes when added to existing traffic. **Figure 7-2** shows the other projects AM/PM peak hour traffic volumes.

The worksheets providing AM/PM peak hour traffic from other approved/pending projects in the area and the calculation for the 5% growth are provided in **Appendix E**.

FIGURE 7-1

Other Projects Average Daily Traffic

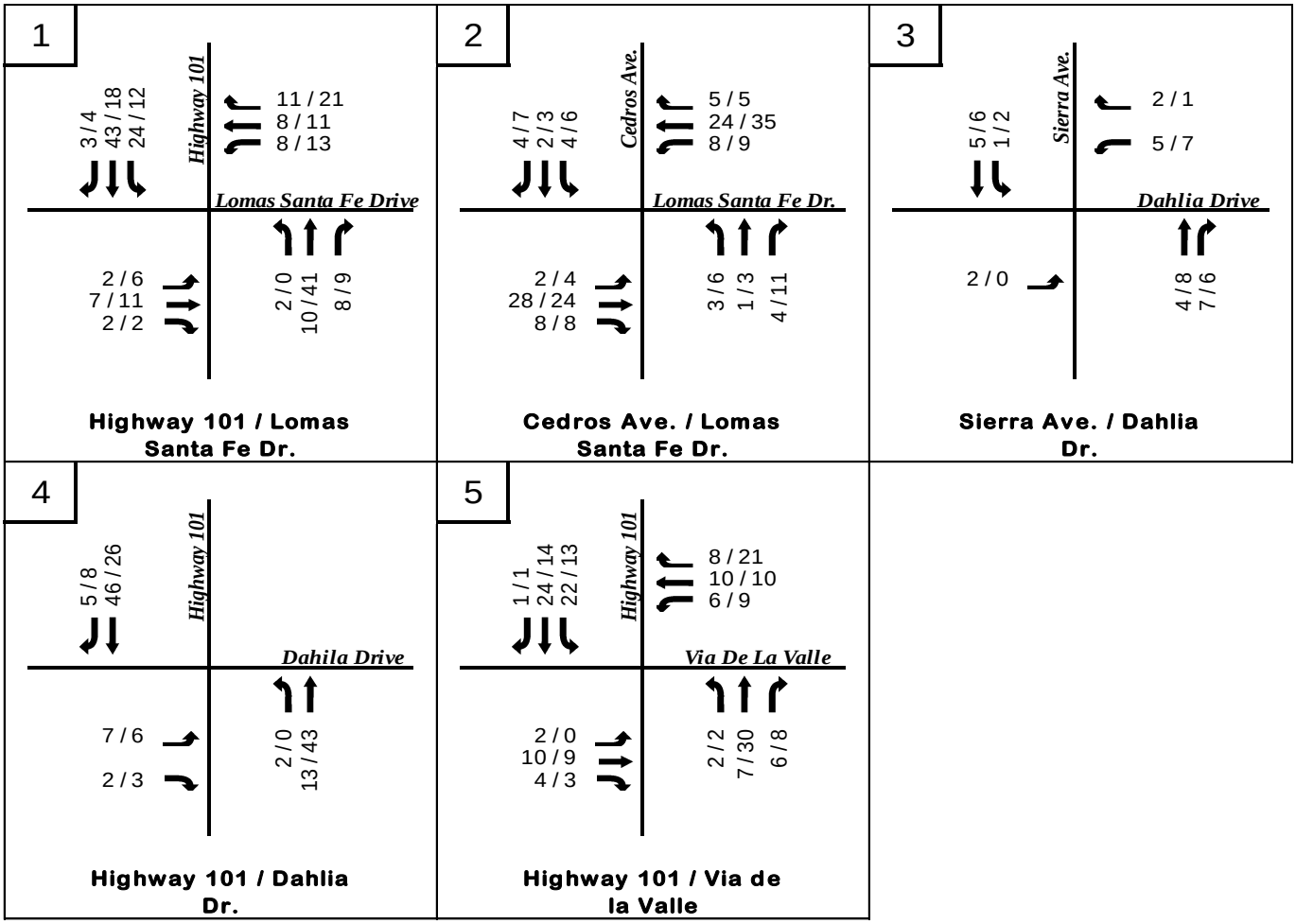


FIGURE 7-2

Other Projects AM/PM Peak Hour Traffic

8.0 NEAR TERM WITHOUT PROJECT

In order to determine Near Term traffic, USAI followed the methodology outlined in the SANTEC/ITE Guidelines for Traffic Impact Studies. An examination of the immediate area surrounding the project to include projects that were approved, pending approval, or planned in the area and assumed to be constructed and occupied at the project's opening day were evaluated, as discussed in the previous section of this report. Other project traffic volumes were added to the existing traffic to reflect an "existing plus other project" or Near Term scenario.

8.1 STREET SEGMENTS

Figure 8-1 shows average daily traffic volumes from the other projects added to existing average daily traffic volumes.

Table 8-1 shows street segment LOS without project traffic. As shown in the table, all street segments are projected to operate at acceptable levels of service. Via de la Valle was analyzed using the peak hour analysis contained in Chapter 11 of the current HCM and the segment was found to operate at an acceptable LOS D or better.

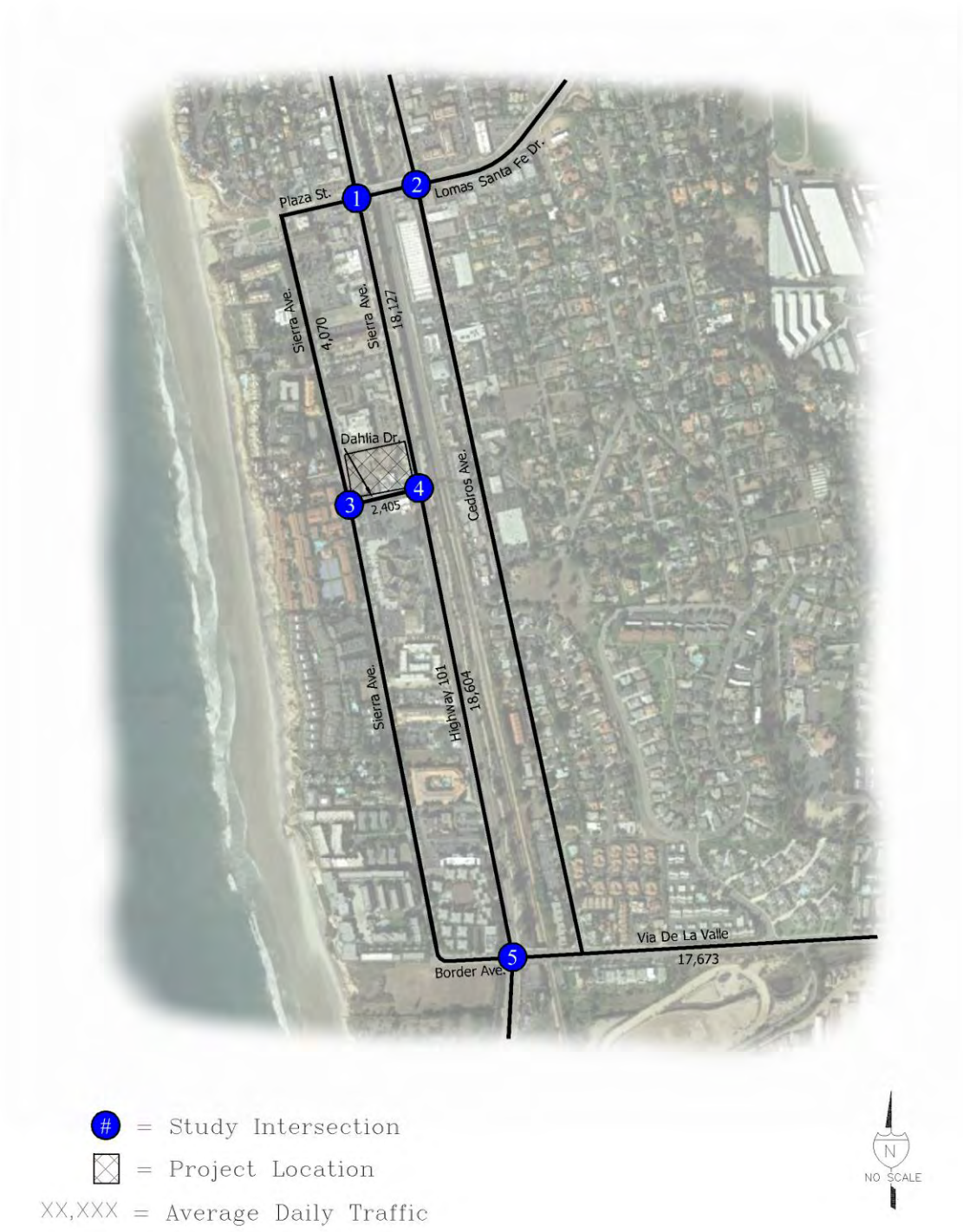


FIGURE 8-1

Near Term Without Project Average Daily Traffic

TABLE 8-1

Near Term Without Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	SD	4	4-M	40,000	18,127	0.45	B
	Dahlia Drive to Via De La Valle	SD	4	4-M	40,000	18,604	0.47	B
Dahlia Drive	Sierra Avenue to Highway 101	SD	2	2-Cc	8,000	2,405	0.30	A
Sierra Avenue	Plaza Street to Dahlia Drive	SD	2	2-Cd	8,000	4,070	0.51	C

Legend:

Class. = Functional Class
Cap. = Capacity
V/C. = Volume/ Capacity
LOS = Level of Service
2-Cc = 2 Lane Collector (w/ commercial-industrial property)
2-Cd = 2 Lane Collector (multi-family)
M = 2 lane major arterial adjusted capacity for number of lanes.
4-M = 4 lane major arterial

Near Term Without Project Arterial Levels of Service

Road	Segment	Direction	Arterial Speed (mph)		LOS	
			AM	PM	AM	PM
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	18.4	16.4	C	D
		Westbound	21.9	20.6	C	C

Legend:

LOS = Level of Service

8.2 INTERSECTIONS

Figure 8-2 shows the peak hour traffic volumes from the other projects when added to existing peak hour volumes at the study area intersections. **Table 8-2** shows the resulting AM and PM peak hour LOS. As shown in **Table 8-2**, all intersections are projected to operate at acceptable levels of service.

Appendix F includes the Near Term Without Project Synchro worksheets.

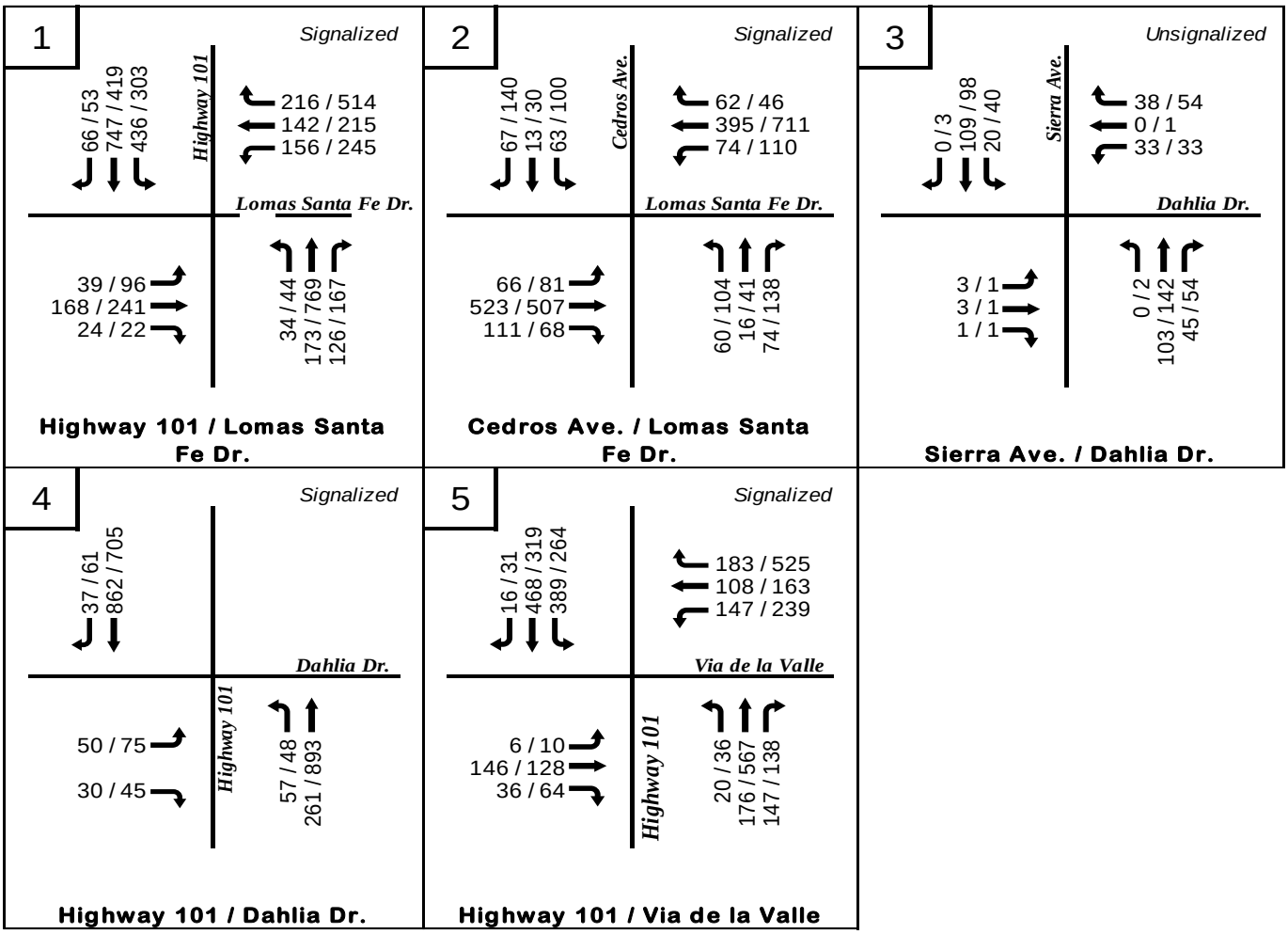


FIGURE 8-2

Near Term Without Project AM/PM Peak Hour Traffic

TABLE 8-2

Near Term Without Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Highway 101 / Lomas Santa Fe Dr.	Signalized	35.4	D	43.5	D
2	Cedros Ave. / Lomas Santa Fe Dr.	Signalized	24.3	C	23.8	C
3	Sierra Ave. / Dahlia Dr.	Unsignalized	8.1	A	8.5	A
4	Highway 101 / Dahlia Dr.	Signalized	9.3	A	9.8	A
5	Highway 101 / Via de la Valle	Signalized	38.6	D	44.7	D

Notes:

Delay = seconds per vehicle

LOS = Level of Service

9.0 NEAR TERM WITH PROJECT

This section of the report evaluates the Near Term With Project traffic conditions by adding the other projects plus the project traffic to existing volumes and evaluating project traffic impacts.

9.1 STREET SEGMENTS

Figure 9-1 shows average daily traffic volumes with project traffic added to existing plus other projects traffic volumes. Via de la Valle was analyzed using the peak hour analysis contained in Chapter 11 of the current HCM and the segment was found to operate at an acceptable LOS D or better.

Table 9-1 shows street segment levels of service with project traffic.

As shown in **Table 9-1**, all street segments analyzed in the study area are projected to operate at acceptable levels of service.

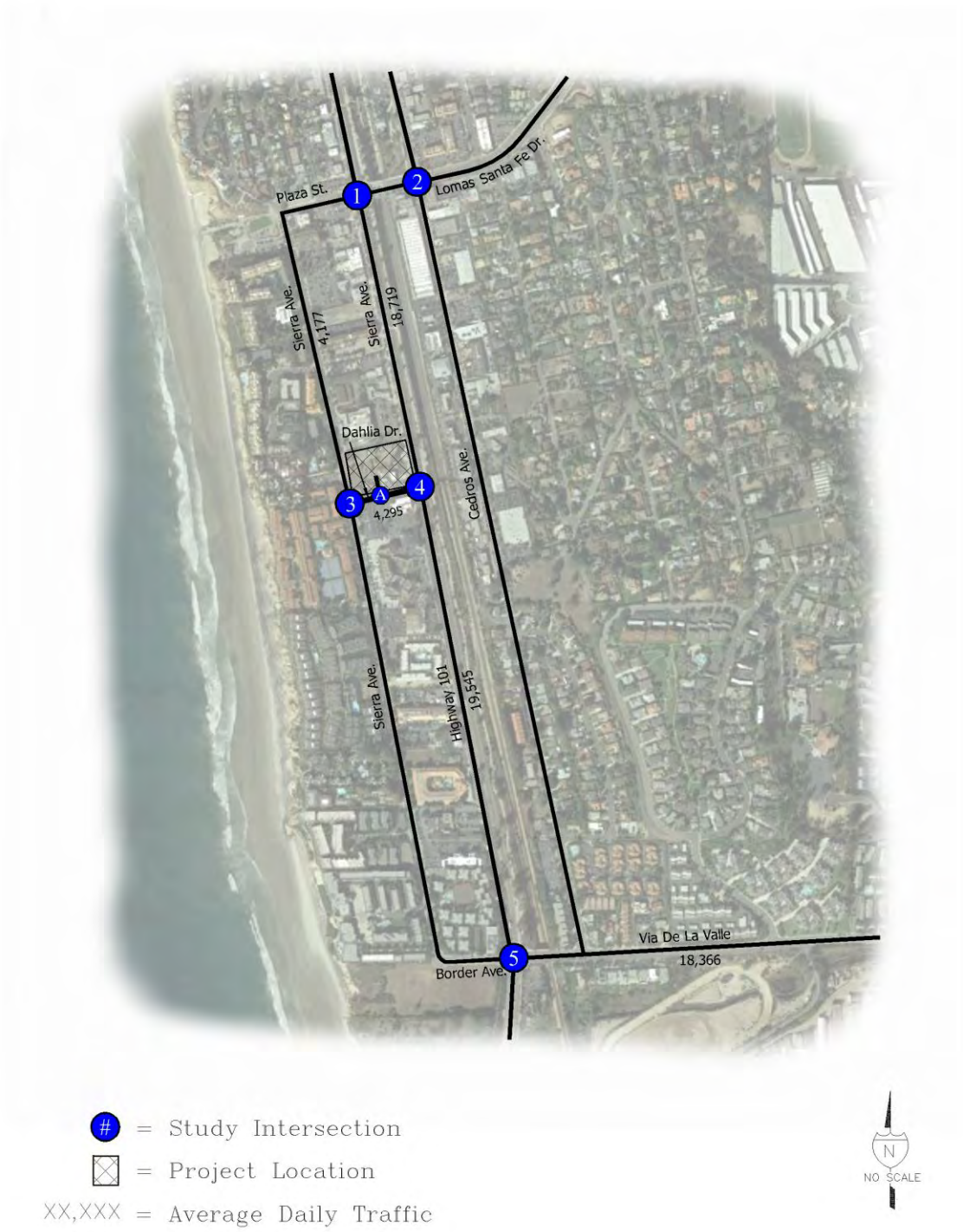


FIGURE 9-1

Near Term With Project Average Daily Traffic

TABLE 9-1

Near Term With Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	SD	4	4-M	40,000	18,719	0.47	B
	Dahlia Drive to Via De La Valle	SD	4	4-M	40,000	19,545	0.49	B
Dahlia Drive	Sierra Avenue to Highway 101	SD	2	2-Cc	8,000	4,295	0.54	C
Sierra Avenue	Plaza Street to Dahlia Drive	SD	2	2-Cd	8,000	4,177	0.52	C

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property)

2-Cd = 2 Lane Collector (multi-family)

M = 2 lane major arterial adjusted capacity for number of lanes.

4-M = 4 lane major arterial

Near Term With Project Arterial Levels of Service

Road	Segment	Direction	Arterial Speed (mph)		LOS	
			AM	PM	AM	PM
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	18.3	16.4	C	D
		Westbound	21.9	20.6	C	C

Legend:

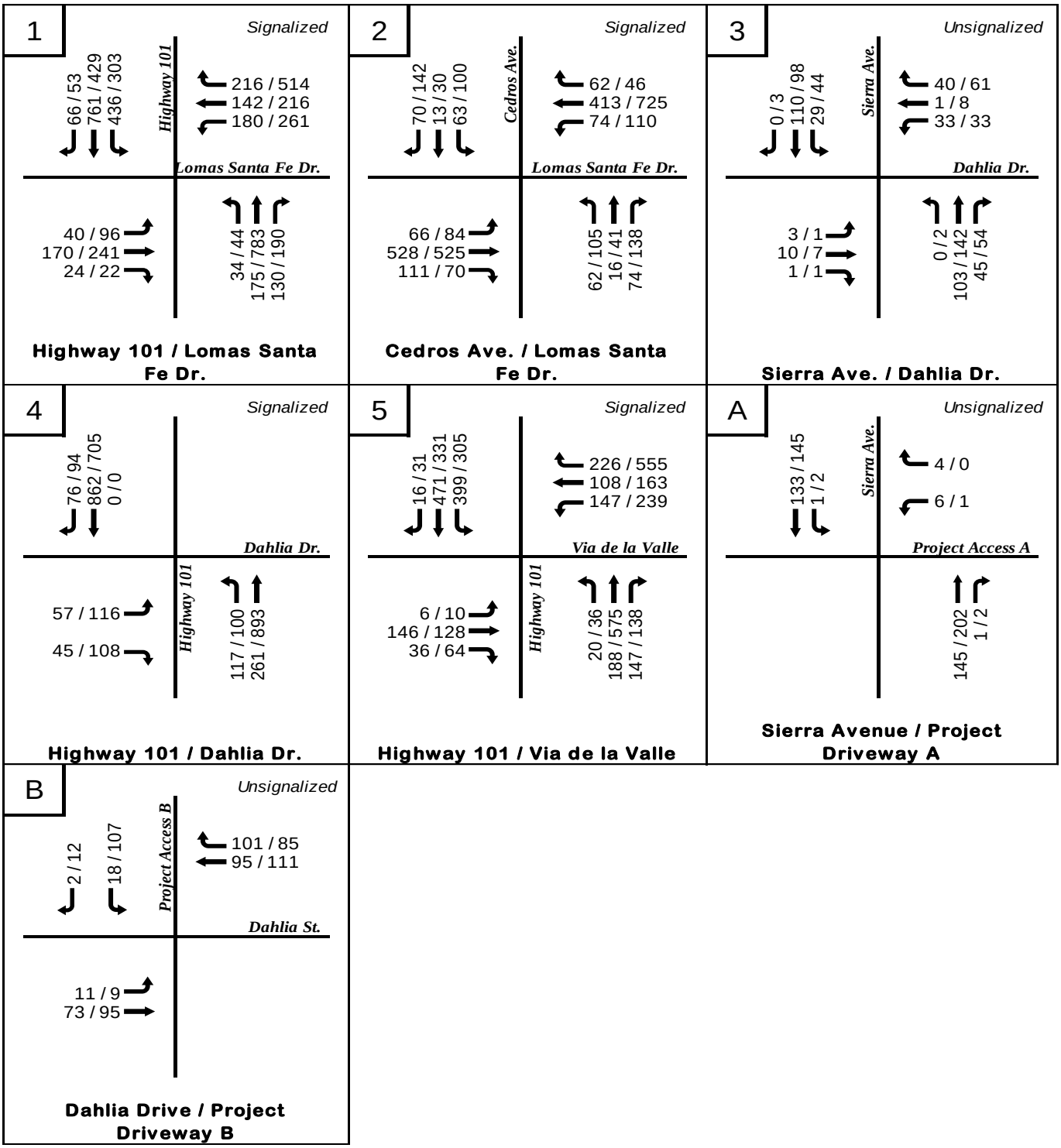
LOS = Level of Service

9.2 INTERSECTIONS

Figure 9-2 shows existing plus other projects plus project combined traffic volumes during AM/PM peak hours at study area intersections.

Table 9-2 includes study area intersection LOS with the project traffic added. As shown in **Table 9-2**, all intersections show acceptable levels of service.

Appendix G includes the Near Term With Project Synchro worksheets.



XX / XX = AM / PM Peak hour volumes

FIGURE 9-2

Near Term With Project AM/PM Peak Hour Traffic

TABLE 9-2
Near Term With Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Highway 101 / Lomas Santa Fe Dr.	Signalized	37.1	D	43.9	D
2	Cedros Ave. / Lomas Santa Fe Dr.	Signalized	25.5	C	23.8	C
3	Sierra Ave. / Dahlia Dr.	Unsignalized	8.2	A	8.6	A
4	Highway 101 / Dahlia Dr.	Signalized	11.3	B	17	B
5	Highway 101 / Via de la Valle	Signalized	39	D	54.2	D
A	Sierra Ave. / Project Drwy. A	Unsignalized	0.4	A	0.1	A
B	Dahlia Dr. / Project Drwy. B	Unsignalized	1	A	3.4	A

Notes:

Delay = seconds per vehicle

LOS = Level of Service

10.0 HORIZON YEAR 2035 WITHOUT PROJECT

This section of the report evaluates the Horizon Year 2035 Without Project condition. The Year 2035 traffic volumes are based on the SANDAG Series 12 model. Traffic volumes from the Year 2035 scenario were compared to near term traffic volumes to verify growth was assumed in the future. If near term traffic volumes exceeded Year 2035 volumes, future (Year 2035) traffic volumes were manually adjusted to reflect the near term volumes which include community growth. Project traffic volumes were then added to the base Year 2035 traffic volumes to obtain Year 2035 With Project traffic volumes.

10.1 STREET SEGMENTS

Street segment volumes for Horizon Year 2035 Without Project are shown in **Figure 10-1**. The street segments LOS for Horizon Year 2035 conditions without the project are shown in **Table 10-1**.

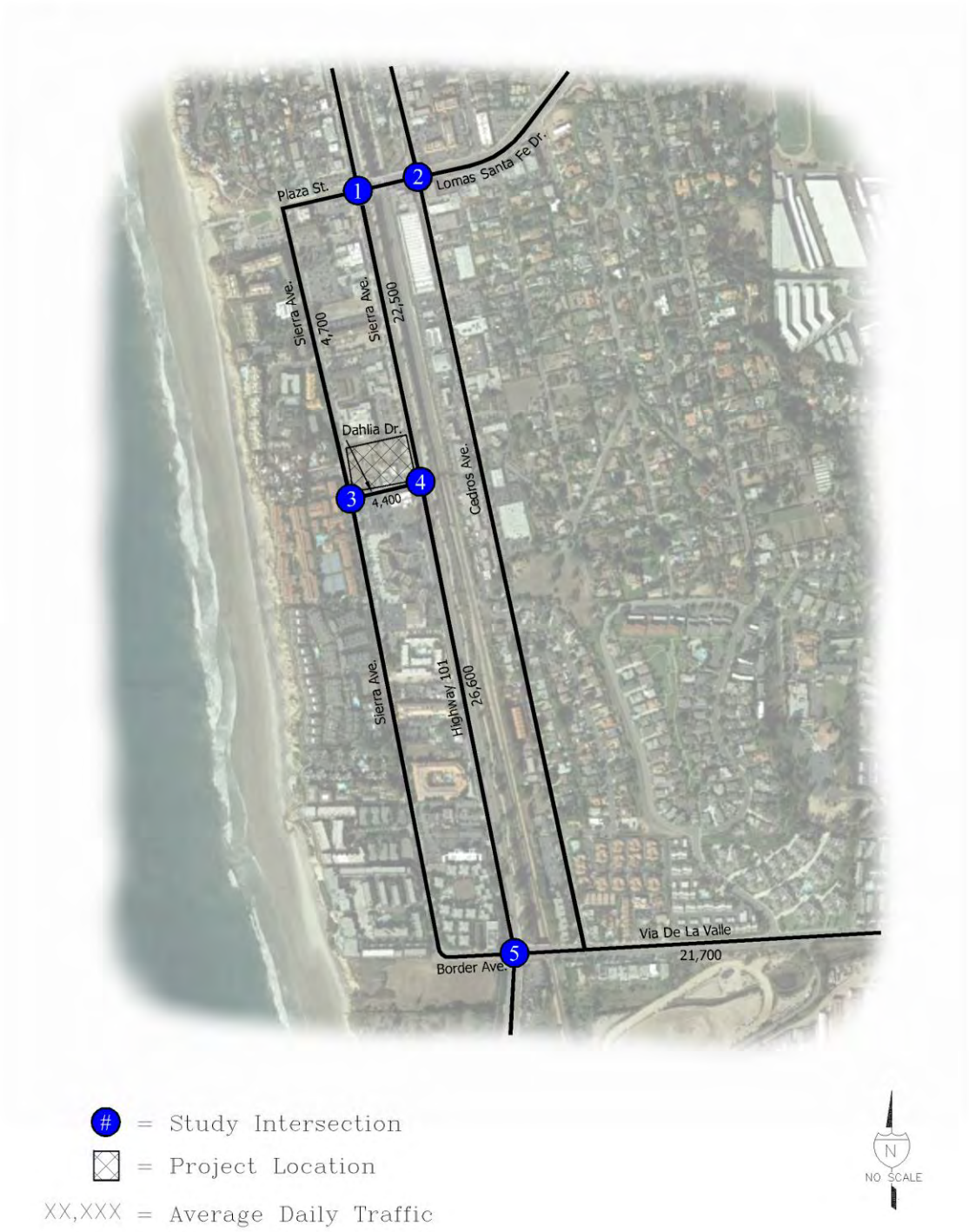


FIGURE 10-1

Horizon Year 2035 Without Project Average Daily Traffic

TABLE 10-1

Horizon Year 2035 Without Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	SD	4	4-M	40,000	22,500	0.56	C
	Dahlia Drive to Via De La Valley	SD	4	4-M	40,000	26,600	0.67	C
Dahlia Drive	Sierra Avenue to Highway 101	SD	2	2-Cc	8,000	4,400	0.55	C
Sierra Avenue	Plaza Street to Dahlia Drive	SD	2	2-Cd	8,000	4,700	0.59	C

Legend:

Class. = Functional Class
Cap. = Capacity
LOS = Level of Service
2-Cc = 2 Lane Collector (w/ commercial-industrial property)
2-Cd = 2 Lane Collector (multi-family)
M = 2 lane major arterial adjusted capacity for number of lanes.
4-M = 4 lane major arterial

Notes:

Taken from SANDAG Series 11 Year 2030 traffic model dated Feb. 2012

Horizon Year 2035 Without Project Arterial Levels of Service

Road	Segment	Direction	Arterial Speed (mph)		LOS	
			AM	PM	AM	PM
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	16.8	15.4	D	D
		Westbound	21.8	20.6	C	C

Legend:

LOS = Level of Service

As shown in **Table 10-1**, all street segments analyzed in the study area are projected to operate at acceptable levels of service. Via de la Valle was analyzed using the peak hour analysis contained in Chapter 11 of the current HCM and the segment was found to operate at an acceptable LOS D or better.

10.2 INTERSECTIONS

Year 2035 AM/PM peak hour volume worksheets for all study intersections can be found in **Appendix H**.

In the future (Year 2035) scenario with and without the project, network changes are assumed with the addition of the proposed Solana 101 project illustrated in **Figure 10-2**.

Figure 10-3 shows the expected Horizon Year 2035 Without Project peak hour volumes at the intersections analyzed.

Table 10-2 shows the AM/PM peak hour intersection levels of service in the Year 2035 scenario. As shown, all intersections are projected to operate at acceptable level of service except for:

- Highway 101 / Lomas Santa Fe Drive LOS E in the PM peak hour

The Synchro worksheets for the Horizon Year 2035 Without Project condition may be found in **Appendix I**.

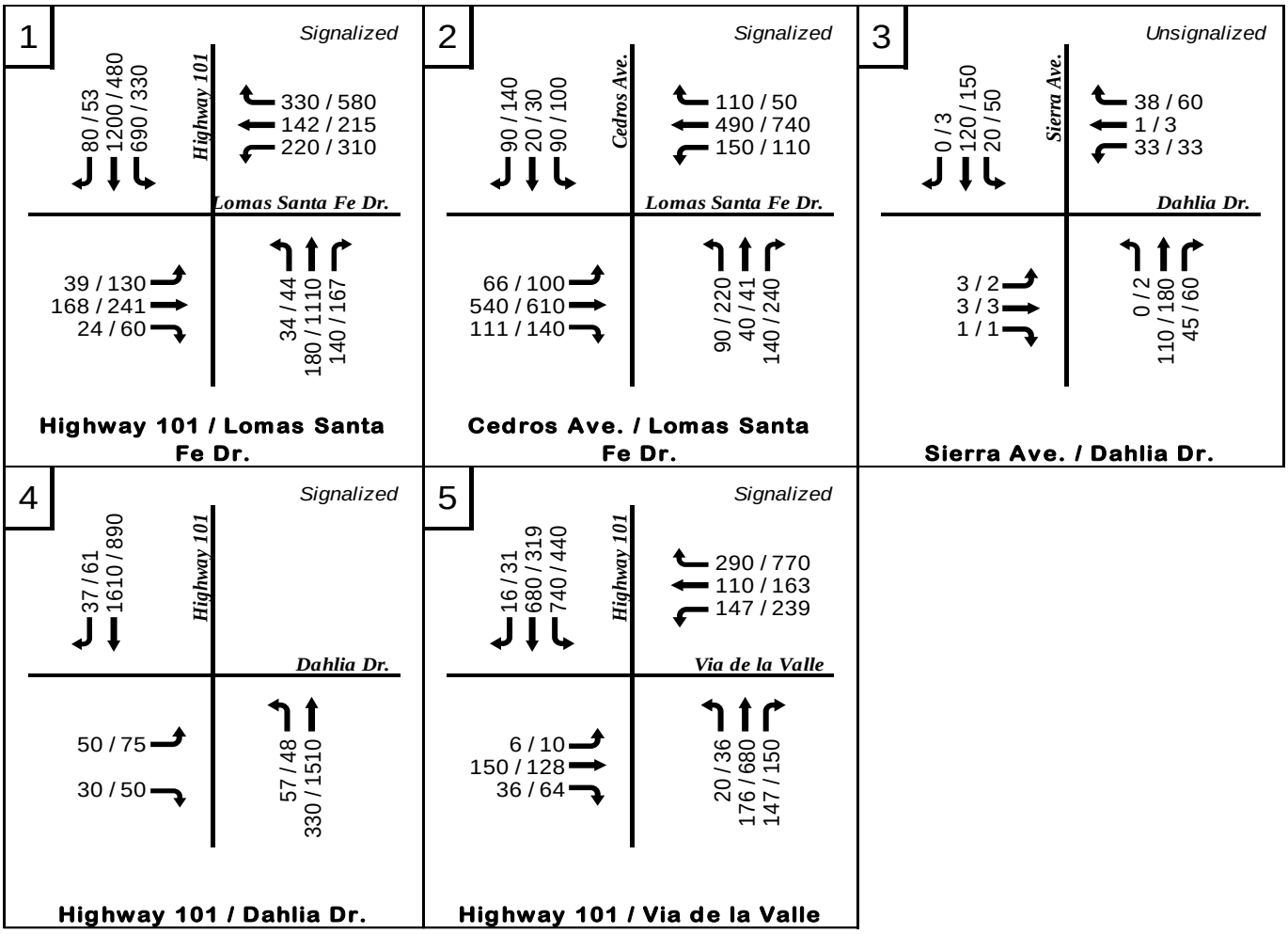


FIGURE 10-3

Horizon Year 2035 Without Project AM/PM Peak Hour Traffic Volumes

TABLE 10-2

Horizon Year 2035 Without Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Highway 101 / Lomas Santa Fe Dr.	Signalized	47.6	D	69.9	E
2	Cedros Ave. / Lomas Santa Fe Dr.	Signalized	24.6	C	23.8	C
3	Sierra Ave. / Dahlia Dr.	Signalized	8.2	A	9.2	A
4	Highway 101 / Dahlia Dr.	Signalized	12.5	B	10	B
5	Highway 101 / Via de la Valle	Signalized	40.6	D	45	D

Notes:

LOS = Level of Service

Delay= (sec./veh.)

11.0 HORIZON YEAR 2035 WITH PROJECT

As previously discussed, Year 2035 With Project volumes are based on SANDAG's Series 12 travel forecast. Project traffic was added to the Horizon Year 2035 Without Project volumes to get the Horizon Year 2035 With Project traffic volumes.

11.1 STREET SEGMENTS

Figure 11-1 shows the Horizon Year 2035 With Project street segment traffic volumes.

An analysis was completed for street segments in the Horizon Year 2035 With Project condition based on the network assumptions discussed in the previous section of this report. As shown in **Table 11-1**, all street segments analyzed in the study area are projected to operate at acceptable levels of service. Via de la Valle was analyzed using the peak hour analysis contained in Chapter 11 of the current HCM and the segment was found to operate at an acceptable LOS D or better.

FIGURE 11-1

Horizon Year 2035 With Project Average Daily Traffic

TABLE 11-1

Horizon Year 2035 With Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	SD	4	4-M	40,000	23,092	0.58	C
	Dahlia Drive to Via De La Valley	SD	4	4-M	40,000	27,541	0.69	C
Dahlia Drive	Sierra Avenue to Highway 101	SD	2	2-Cc	8,000	6,290	0.79	D
Sierra Avenue	Plaza Street to Dahlia Drive	SD	2	2-Cd	8,000	4,808	0.60	C

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property)

2-Cd = 2 Lane Collector (multi-family)

M = 2 lane major arterial adjusted capacity for number of lanes.

4-M = 4 lane major arterial

Horizon Year 2035 With Project Arterial Levels of Service

Road	Segment	Direction	Arterial Speed (mph)		LOS	
			AM	PM	AM	PM
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	16.8	15.4	D	D
		Westbound	21.8	20.6	C	C

Legend:

LOS = Level of Service

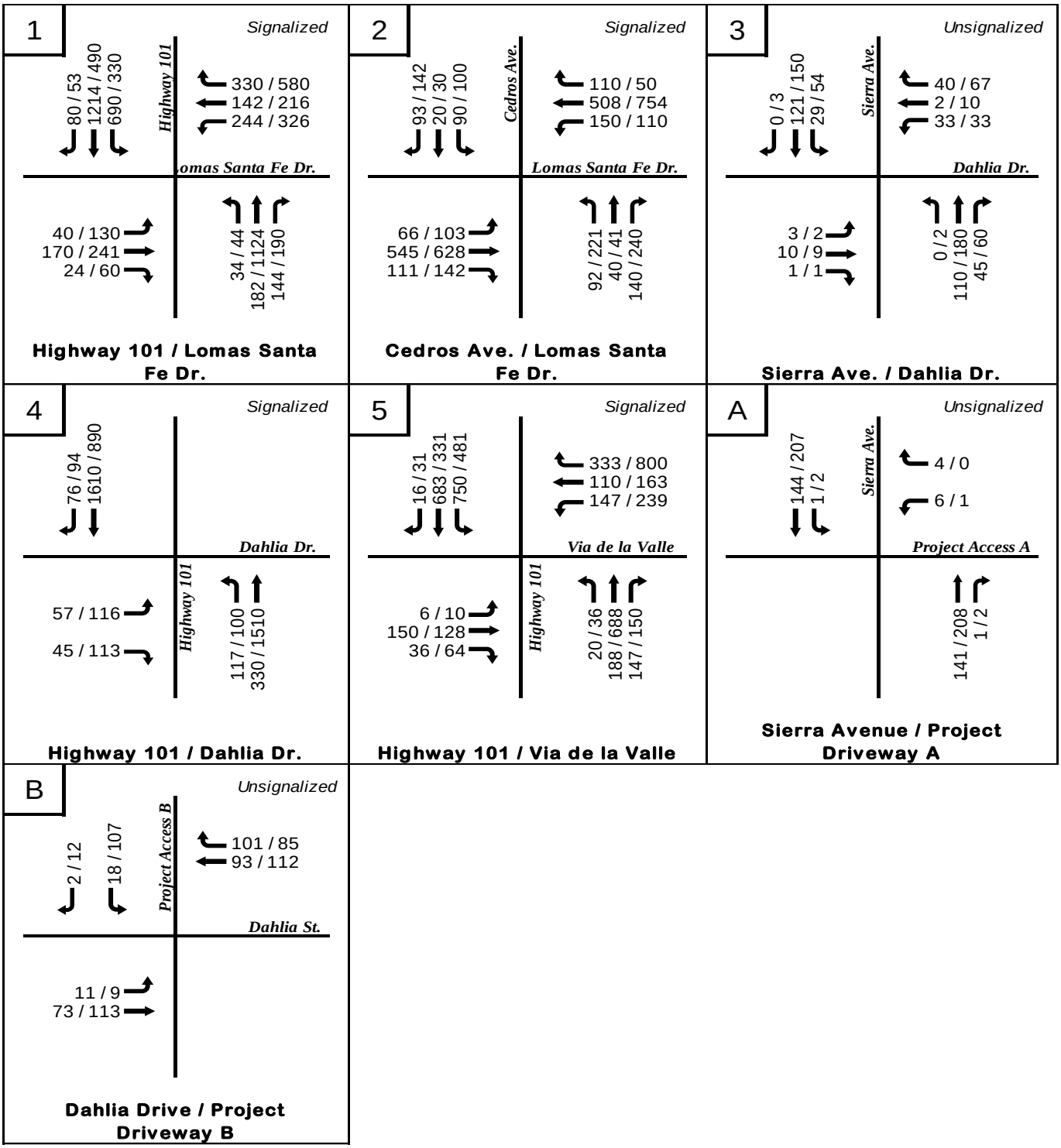
11.2 HORIZON YEAR 2035 WITH PROJECT INTERSECTIONS VOLUMES

Figure 11-2 shows the expected peak hour volumes at Horizon Year 2035 With Project for the intersections analyzed. **Table 11-2** shows the AM and PM peak hour LOS for the Horizon Year 2035 With Project condition.

As shown, all intersections are projected to operate at acceptable levels of service except for:

- Highway 101 / Lomas Santa Fe Drive LOS E in the PM peak

Appendix J includes Synchro worksheets for Horizon Year 2035 With Project condition.



XX / XX = AM / PM Peak hour volumes

FIGURE 11-2

Horizon Year 2035 With Project AM/PM Peak Hour Traffic

TABLE 11-2

Horizon Year 2035 With Project Intersection Levels of Service

#	Intersection	Year 2035				Year 2035 + Project							
		AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
		D	LOS	D	LOS	D	LOS			D	LOS		
1	Highway 101 / Lomas Santa Fe Dr.	47.6	D	69.9	E	52.8	D	5.2	No	70.4	E	0.5	No
2	Cedros Ave. / Lomas Santa Fe Dr.	24.6	C	23.8	C	39.3	D	14.7	No	35.0	C	11.2	No
3	Sierra Ave. / Dahlia Dr.	8.2	A	9.2	A	8.3	A	0.1	No	9.4	A	0.2	No
4	Highway 101 / Dahlia Dr.	12.5	B	10.0	B	19.0	B	6.5	No	17.9	B	7.9	No
5	Highway 101 / Via de la Valle	40.6	D	45.0	D	41.4	D	0.8	No	46.6	D	1.6	No
A	Sierra Ave. / Project Drwy. A	(1)	(1)	(1)	(1)	0.4	A	N/A	No	0.1	A	N/A	No
B	Dahlia Dr. / Project Drwy. B	(1)	(1)	(1)	(1)	1.0	B	N/A	No	3.3	A	N/A	No

Notes:

LOS = Level of Service
Δ = Change
S = Significant
D= Delay in seconds
(1) = Current access to be redesigned with proposed project

12.0 PARKING

The project proposes a two-level subterranean parking garage. The two level parking garage serves both the residential and commercial land uses which include the office, retail, and restaurant uses. Parking ratios are based on the City of Solana Beach Municipal Code requirements. As shown in **Table 12-1**, a summary of the parking calculations for the commercial, residential, ADA, motorcycle, and bicycle spaces are provided. The parking required for the commercial uses include 309 parking spaces and residential (with guest spaces) include 53 spaces for a total of 362 parking spaces. The proposed projects 366 parking stalls adequately address parking.

TABLE 12-1

Parking Summary Table

USE				REQUIREMENTS			SQ. FT. / UNITS		№ OF STALLS REQUIRED	№ OF BICYCLE SPACE REQUIRED
Residential				2 spaces for each	2	bdrm units	33,473	sf	36	N/A
							18	u		
Residential				1.5 spaces for each	1	bdrm units			11	
							7	u		
Residential Guest				1 space for each	4	units	25	u	6	
Office Space				1 space for each	300	sf. of gfa.	45,587	sf	152	31
F&B (total)	Building area	10,561.97	sf	1 space for each	100	sf. of gfa.	13,335	sf	133	
	Outdoor area	2,772.76	sf							
Retail				1 space for each	200	sf. of gfa.	4,814	sf	24	
									362	31
						PARKING GARAGE			№ OF STALLS PROVIDED	№ OF ADA STALLS (8 REQUIRED)
						P1			164	2 VAN ACCESSIBLE STALLS
						P2			202	8 ACCESSIBLE STALLS
						TOTAL			366	

13.0 CONCLUSIONS AND RECOMMENDATIONS

13.1 PROJECT TRIP GENERATION

The proposed project is expected to generate 1,930 ADT with 140 (112 in / 28 out) trips in the AM peak hour and 204 (92 in / 112 out) trips in the PM peak hour.

13.2 EXISTING CONDITIONS

Street Segments:

All street segments are projected to operate at an acceptable LOS (D or Better) in the existing condition. A more detailed arterial analysis, outlined in Chapter 11 of the HCM, was used for Via De La Valle and the segment was found to operate at an acceptable LOS D or better.

Intersections:

All intersections are expected to operate at LOS "D" or better in the Existing condition.

13.3 EXISTING WITH PROJECT

When project traffic is added to existing traffic, the following results occur.

Street Segments:

All street segments are projected to operate at an acceptable LOS (D or Better) in the existing condition. A more detailed arterial analysis, outlined in Chapter 11 of the HCM, was used for Via De La Valle and the segment was found to operate at an acceptable LOS D or better.

Intersections:

All intersections are projected to operate at LOS "D" or better in the Existing With Project condition.

13.4 NEAR TERM WITHOUT PROJECT

Street Segments:

All street segments are projected to operate at an acceptable LOS (D or Better) in the existing condition. A more detailed arterial analysis, outlined in Chapter 11 of the HCM, was used for Via De La Valle and the segment was found to operate at an acceptable LOS D or better.

Intersections:

All intersections are projected to operate at LOS "D" or better in Near Term Without Project scenario.

13.5 NEAR TERM WITH PROJECT

When the existing plus the other projects plus the proposed project is added, the following results occur.

Street Segments:

All street segments are projected to operate at an acceptable LOS (D or Better) in the existing condition. A more detailed arterial analysis, outlined in Chapter 11 of the HCM, was used for Via De La Valle and the segment was found to operate at an acceptable LOS D or better.

Intersections:

All intersections are projected to operate at LOS "D" or better in this condition with the project.

13.6 DIRECT & CUMULATIVE IMPACTS:

Street Segments:

Table 13-1 shows the summary of the direct impacts in the Existing With Project scenario for street segments within the study area. As shown, there are no significant direct street segment impacts expected as a result of the project. A summary of cumulative impacts in the Near Term With Project scenario for street segments within the study area is shown in **Table 13-2**. As shown, there are no significant direct or short term cumulative street segment impacts expected as a result of the project. Therefore, no mitigation is proposed.

Intersections:

Table 13-3 shows the summary of the direct impacts in the Existing With Project scenario for intersections within the study area. As shown in the table, there are no significant impacts. A summary of cumulative impacts in the Near Term With Project scenario for intersections within the study area are shown in **Table 13-4**. As shown, there are no significant cumulative intersection impacts expected as a result of the project. Therefore, no mitigation is proposed.

TABLE 13-1

Existing With and Without Project Street Segment Significance

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Existing			Existing + Project			ΔV/C	Is this impact Significant?
					LOS	Volume	V/C	LOS	Volume	V/C		
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	4	40,000	4-M	B	18,127	0.45	B	18,719	0.47	0.015	***NO***
	Dahlia Drive to Via De La Valle	4	40,000	4-M	B	18,604	0.47	B	19,545	0.49	0.024	***NO***
Dahlia Drive	Sierra Avenue to Highway 101	2	8,000	2-Cc	A	2,405	0.30	C	4,295	0.54	0.236	***NO***
Sierra Avenue	Plaza Street to Dahlia Drive	2	8,000	2-Cd	C	3,966	0.50	C	4,074	0.51	0.013	***NO***

Legend:

Class. = Functional Class

Cap. = Capacity

V/C.= Volume/ Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property)

2-Cd = 2 Lane Collector (multi-family)

M = 2 lane major arterial adjusted capacity for number of lanes.

4-M = 4 lane major arterial

Existing With and Without Project Arterial Levels of Service

Road	Segment	Direction	Existing				Existing + Project				ΔSpeed (mph) AM	ΔSpeed (mph) PM	Is this impact Significant?
			AM		PM		AM		PM				
			Speed	LOS	Speed	LOS	Speed	LOS	Speed	LOS			
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	18.8	C	16.7	D	18.7	C	16.7	D	0.1	0.0	***NO***
		Westbound	21.7	C	20.5	C	21.7	C	20.5	C	0.0	0.0	***NO***

Legend:

LOS= Level of Service

TABLE 13-2

Near Term Without and Near Term With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Near Term			Near Term + Project			ΔV/C	Is this impact Significant?
					LOS	Volume	V/C	LOS	Volume	V/C		
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	4	40,000	4-M	B	18,127	0.45	B	18,719	0.47	0.015	***NO***
	Dahlia Drive to Via De La Valle	4	40,000	4-M	B	18,604	0.47	B	19,545	0.49	0.024	***NO***
Dahlia Drive	Sierra Avenue to Highway 101	2	8,000	2-Cc	A	2,405	0.30	C	4,295	0.54	0.236	***NO***
Sierra Avenue	Plaza Street to Dahlia Drive	2	8,000	2-Cd	C	4,070	0.51	C	4,177	0.52	0.013	***NO***

Legend:

Class. = Functional Class

Cap. = Capacity

V/C. =Volume/Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property)

2-Cd = 2 Lane Collector (multi-family)

M = 2 lane major arterial adjusted capacity for number of lanes.

4-M = 4 lane major arterial

Near Term Without and Near Term With Project Arterial Levels of Service

Road	Segment	Direction	Near Term				Near Term + Project				ΔSpeed (mph) AM	ΔSpeed (mph) PM	Is this impact Significant?
			AM		PM		AM		PM				
			Speed	LOS	Speed	LOS	Speed	LOS	Speed	LOS			
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	18.4	C	16.4	D	18.3	C	16.4	D	0.1	0.0	***NO***
		Westbound	21.9	C	20.6	C	21.9	C	20.6	C	0.0	0.0	***NO***

Legend:

LOS= Level of Service

TABLE 13-3

Existing Without and Existing With Project Intersection Comparison

#	Intersection	Existing				Existing + Project							
		AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
		D	LOS	D	LOS	D	LOS			D	LOS		
1	Highway 101 / Lomas Santa Fe Dr.	33.9	C	41.3	D	34.1	C	0.2	No	41.8	D	0.5	No
2	Cedros Ave. / Lomas Santa Fe Dr.	24.3	C	23.7	C	24.5	C	0.2	No	23.8	C	0.1	No
3	Sierra Ave. / Dahlia Dr.	8.0	A	8.3	A	8.1	A	0.1	No	8.4	A	0.1	No
4	Highway 101 / Dahlia Dr.	7.2	A	9.0	A	11.3	B	4.1	No	15.1	B	6.1	No
5	Highway 101 / Via de la Valle	31.0	C	35.9	D	31.0	C	0.0	No	50.0	D	14.1	No
A	Sierra Ave. / Project Drwy. A	(1)	(1)	(1)	(1)	0.4	A	N/A	No	0.1	A	N/A	No
B	Dahlia Dr. / Project Drwy. B	(1)	(1)	(1)	(1)	1.0	A	N/A	No	3.4	A	N/A	No

Notes:

LOS = Level of Service
Δ = Change
S = Significant
D= Delay
(1) = Current access to be redesigned with proposed project

TABLE 13-4

Near Term Without and Near Term With Project Intersection Comparison

#	Intersection	Near Term				Near Term + Project							
		AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
		D	LOS	D	LOS	D	LOS			D	LOS		
1	Highway 101 / Lomas Santa Fe Dr.	35.4	D	43.5	D	37.1	D	1.7	No	43.9	D	0.4	No
2	Cedros Ave. / Lomas Santa Fe Dr.	24.3	C	23.8	C	25.5	C	1.2	No	23.8	C	0.0	No
3	Sierra Ave. / Dahlia Dr.	8.1	A	8.5	A	8.2	A	0.1	No	8.6	A	0.1	No
4	Highway 101 / Dahlia Dr.	9.3	A	9.8	A	11.3	B	2.0	No	17.0	B	7.2	No
5	Highway 101 / Via de la Valle	38.6	D	44.7	D	39.0	D	0.4	No	54.2	D	9.5	No
A	Sierra Ave. / Project Drwy. A	(1)	(1)	(1)	(1)	0.4	A	N/A	No	0.1	A	N/A	No
B	Dahlia Dr. / Project Drwy. B	(1)	(1)	(1)	(1)	1.0	A	N/A	No	3.4	A	N/A	No

Notes:

LOS = Level of Service
Δ = Change
S = Significant
D= Delay
(1) = Current access to be redesigned with proposed project

13.7 HORIZON YEAR 2035 WITHOUT PROJECT

When future (Year 2035) traffic volumes without project are evaluated, the following results occur.

Street Segments:

All street segments are projected to operate at an acceptable LOS (D or Better) in the Horizon Year 2035 Without Project condition. A more detailed arterial analysis, outlined in Chapter 11 of the HCM, was used for Via De La Valle and the segment was found to operate at an acceptable LOS D or better.

Intersections:

All intersections are projected to operate at LOS "D" or better in this condition without the project except for the following intersections:

- Highway 101 / Lomas Santa Fe Drive LOS E in the PM peak

13.8 HORIZON YEAR 2035 WITH PROJECT

When future traffic volumes including project traffic are evaluated, the following results occur.

Street Segments:

All street segments are projected to operate at an acceptable LOS (D or Better) in the Horizon Year 2035 With Project condition. A more detailed arterial analysis, outlined in Chapter 11 of the HCM, was used for Via De La Valle and the segment was found to operate at an acceptable LOS D or better.

Intersections:

All intersections are projected to operate at LOS "D" or better in this condition with the project except for the following intersections:

- Highway 101 / Lomas Santa Fe Drive LOS E in the PM peak

13.9 CUMULATIVE LONG TERM (YEAR 2035) IMPACTS

Street Segments:

Table 13-5 shows the summary of the cumulative impacts in the Horizon Year 2035 Plus Project scenario for street segments within the study area. Via de la Valle was analyzed more extensively with an arterial analysis during the peak hours and the segment was found to operate at an acceptable LOS D or better.

Intersections:

Table 13-6 shows the summary of the cumulative impacts in the Horizon Year 2035 plus project scenario for intersections within the study area. As shown, there are no significant impacts expected as the result of project implementation. Therefore, no mitigation is proposed.

TABLE 13-5

Horizon Year 2035 Without and With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Year 2030			Year 2030 + Project			Δ V/C	Is this impact Significant?
					LOS	Volume	V/C	LOS	Volume	V/C		
Highway 101	Lomas Santa Fe Drive to Dahlia Drive	4	40,000	4-M	C	22,500	0.56	C	23,092	0.58	0.015	***NO***
	Dahlia Drive to Via De La Valle	4	40,000	4-M	C	26,600	0.67	C	27,541	0.69	0.024	***NO***
Dahlia Drive	Sierra Avenue to Highway 101	2	8,000	2-Cc	C	4,400	0.55	D	6,290	0.79	0.236	***NO***
Sierra Avenue	Plaza Street to Dahlia Drive	2	8,000	2-Cd	C	4,700	0.59	C	4,808	0.60	0.013	***NO***

Legend:

Class. = Functional Class

Cap. = Capacity

V/C.= Volume/Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property)

2-Cd = 2 Lane Collector (multi-family)

M = 2 lane major arterial adjusted capacity for number of lanes.

4-M = 4 lane major arterial

Horizon Year 2035 Without and With Project Arterial Levels of Service

Road	Segment	Direction	Year 2035				Year 2035 + Project				Δ Speed (mph) AM	Δ Speed (mph) PM	Is this impact Significant?
			AM		PM		AM		PM				
			Speed	LOS	Speed	LOS	Speed	LOS	Speed	LOS			
Via de la Valle	Highway 101 to Jimmy Durante Blvd.	Eastbound	16.8	D	15.4	D	16.8	D	15.4	D	0.0	0.0	***NO***
		Westbound	21.8	C	20.6	C	21.8	C	20.6	C	0.0	0.0	***NO***

Legend:

LOS= Level of Service

TABLE 13-6

Horizon Year 2035 With and Without Project Intersection Summary

#	Intersection	Year 2035				Year 2035 + Project							
		AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
		D	LOS	D	LOS	D	LOS			D	LOS		
1	Highway 101 / Lomas Santa Fe Dr.	47.6	D	69.9	E	52.8	D	5.2	No	70.4	E	0.5	No
2	Cedros Ave. / Lomas Santa Fe Dr.	24.6	C	23.8	C	39.3	D	14.7	No	35.0	C	11.2	No
3	Sierra Ave. / Dahlia Dr.	8.2	A	9.2	A	8.3	A	0.1	No	9.4	A	0.2	No
4	Highway 101 / Dahlia Dr.	12.5	B	10.0	B	19.0	B	6.5	No	17.9	B	7.9	No
5	Highway 101 / Via de la Valle	40.6	D	45.0	D	41.4	D	0.8	No	46.6	D	1.6	No
A	Sierra Ave. / Project Drwy. A	(1)	(1)	(1)	(1)	0.4	A	N/A	No	0.1	A	N/A	No
B	Dahlia Dr. / Project Drwy. B	(1)	(1)	(1)	(1)	1.0	B	N/A	No	3.3	A	N/A	No

Notes:

LOS = Level of Service
Δ = Change
S = Significant
D= Delay in seconds
(1) = Current access to be redesigned with proposed project

14.0 REFERENCES

SANDAG (San Diego Association of Governments). (Not So) *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002.*

SANDAG (San Diego Association of Governments) *2006 Congestion Management Program Update, Appendix D*. San Diego, California: SANDAG. July 2006.

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

22nd District Agricultural Association. *Environmental Impact Report, Del Mar Fairgrounds Master Plan.* LSA Associates, Inc. October 2009.

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APPENDIX A

SANDAG TRIP GENERATION TABLE

SANDAG Select Zone Forecast Model

ITE Trip Reduction Table and Calculation

(NOT SO)

BRIEF GUIDE OF VEHICULAR TRAFFIC GENERATION RATES FOR THE SAN DIEGO REGION

SANDAG
401 B Street, Suite 800
San Diego, California 92101
(619) 595-5300 · Fax (619) 595-5305

APRIL 2002

NOTE: This listing only represents a *guide* of average, or estimated, traffic generation "driveway" rates and some very general trip data for land uses (emphasis on acreage and building square footage) in the San Diego region. These rates (both local and national) are subject to change as future documentation becomes available, or as regional sources are updated. For more specific information regarding traffic data and trip rates, please refer to the San Diego Traffic Generators manual. *Always check with local jurisdictions for their preferred or applicable rates.*

LAND USE	TRIP CATEGORIES (PRIMARY:DIVERTED:PASS-BY)[a]	ESTIMATED WEEKDAY VEHICLE TRIP GENERATION RATE (DRIVEWAY)	HIGHEST PEAK HOUR % (plus IN:OUT ratio) Between 5:00-6:00 A.M.	Between 3:00-6:00 P.M.	TRIP LENGTH (Miles)[b]
AGRICULTURE (Open Space)	[80:18:2]	2/acre**			10.8
AIRPORT	[78:20:2]				12.8
Commercial		60/acre, 100/flight, 70/1000 sq. ft.* **	8% (6:4)	8% (5:5)	
General Aviation		6/acre, 2/flight, 6/based aircraft* **	9% (7:3)	15% (5:5)	
Heliports		100/acre**			
AUTOMOBILE[c]					
Car Wash					
Automatic		900/site, 600/acre**	4% (5:5)	8% (5:5)	
Self-serve		100/wash stall**	4% (5:5)	8% (5:5)	
Gasoline	[21:51:28]				2.6
with/Food Mart		160/vehicle fueling space**	7% (5:5)	8% (5:5)	
with/Food Mart & Car Wash		155/vehicle fueling space**	8% (5:5)	9% (5:5)	
Older Service Station Design		160/vehicle fueling space, 800/station**	7% (5:5)	9% (5:5)	
Sales (Dealer & Repair)		60/1000 sq. ft., 300/acre, 60/service stall*	5% (7:3)	8% (4:6)	
Auto Repair Center		20/1000 sq. ft., 400/acre, 20/service stall*	8% (7:3)	11% (4:6)	
Auto Parts Sales		60/1000 sq. ft.**	4%	10%	
Quick Lube		40/service stall**	7% (6:4)	10% (5:5)	
Tire Store		25/1000 sq. ft., 30/service stall**	7% (6:4)	11% (5:5)	
CEMETERY		5/acre*			
CHURCH (or Synagogue)	[64:25:11]	8/1000 sq. ft., 30/acre** (quadruple rates for Sunday, or days of assembly)	5% (6:4)	8% (5:5)	5.1
COMMERCIAL/RETAIL[c]					
Super Regional Shopping Center (More than 80 acres, more than 800,000 sq. ft., w/usually 3+ major stores)		35/1000 sq. ft.[c] 400/acre*	4% (7:3)	10% (5:5)	
Regional Shopping Center (40-80acres, 400,000-800,000 sq. ft., w/usually 2+ major stores)	[64:35:11]	50/1000 sq. ft.[c] 600/acre*	4% (7:3)	9% (5:5)	5.2
Community Shopping Center (15-40 acres, 125,000-400,000 sq. ft., w/usually 1 major store, detached restaurant(s), grocery and drugstore)	[47.31:22]	60/1000 sq. ft., 700/acre* **	4% (6:4)	10% (5:5)	3.6
Neighborhood Shopping Center (Less than 15 acres, less than 125,000 sq. ft., w/usually grocery & drugstore, cleaners, beauty & barber shop. & fast food services)		120/1000 sq. ft., 1200/acre* **	4% (6:4)	10% (5:5)	
Commercial Shops	[45:40:15]				4.3
Specialty Retail/Strip Commercial		40/1000 sq. ft., 400/acre*	3% (6:4)	9% (5:5)	
Electronics Superstore		50/1000 sq. ft.**		10% (5:5)	
Factory Outlet		40/1000 sq. ft.**	3% (7:3)	8% (5:5)	
Supermarket		150/1000 sq. ft., 2000/acre* **	4% (7:3)	10% (5:5)	
Drugstore		90/1000 sq. ft.**	4% (6:4)	10% (5:5)	
Convenience Market (15-18 hours)		500/1000 sq. ft.**	8% (5:5)	8% (5:5)	
Convenience Market (24 hours)		700/1000 sq. ft.**	9% (5:5)	7% (5:5)	
Convenience Market (w/gasoline pumps)		850/1000 sq. ft., 550/vehicle fueling space**	6% (5:5)	7% (5:5)	
Discount Club		80/1000 sq. ft., 800/acre* **	1% (7:3)	9% (5:5)	
Discount Store		60/1000 sq. ft., 600/acre**	3% (6:4)	8% (5:5)	
Furniture Store		8/1000 sq. ft., 100/acre**	4% (7:3)	9% (5:5)	
Lumber Store		30/1000 sq. ft., 150/acre**	7% (6:4)	9% (5:5)	
Home Improvement Superstore		40/1000 sq. ft.**	5% (6:4)	8% (5:5)	
Hardware/Paint Store		60/1000 sq. ft., 800/acre**	2% (6:4)	9% (5:5)	
Garden Nursery		40/1000 sq. ft., 80/acre**	3% (6:4)	10% (5:5)	
Mixed Use: Commercial (w/supermarket)/Residential		110/1000 sq. ft., 2000/acre* (commercial only) 5/dwelling unit, 200/acre* (residential only)	8% (6:4) 9% (3:7)	9% (5:5) 13% (6:4)	
EDUCATION					
University (4 years)	[91:9:0]	2.4/student, 100 acre*	10% (8:2)	9% (3:7)	8.9
Junior College (2 years)	[92:7:1]	1.2/student, 24/1000 sq. ft., 120/acre* **	12% (8:2)	9% (6:4)	8.0
High School	[75:18:8]	1.3/student, 15/1000 sq. ft., 50/acre* **	20% (7:3)	10% (4:6)	4.8
Middle/Junior High	[83:25:12]	1.4/student, 12/1000 sq. ft. 60/acre**	30% (6:4)	9% (4:6)	5.0
Elementary	[57:25:10]	1.0/student, 14/1000 sq. ft., 80/acre* **	32% (6:4)	9% (4:6)	3.4
Day Care	[28:58:14]	5/child, 80/1000 sq. ft.**	17% (5:5)	18% (5:5)	3.7
FINANCIAL[c]	[35:42:23]				3.4
Bank (Walk-in only)		150/1000 sq. ft., 1000/acre* **	4% (7:3)	8% (4:6)	
with Drive-Through		200/1000 sq. ft., 1500/acre*	5% (6:4)	10% (5:5)	
Drive-Through only		250 (125 one-way)/lane*	3% (5:5)	13% (5:5)	
Savings & Loan		60/1000 sq. ft., 800/acre**	2%	9%	
Drive-Through only		100 (50 one-way)/lane**	4%	15%	
HOSPITAL	[78:25:2]				8.3
General		20/bed, 25/1000 sq. ft. 250/acre*	8% (7:3)	10% (4:6)	
Convalescent/Nursing		3/bed**	7% (6:4)	7% (4:6)	
INDUSTRIAL					
Industrial/Business Park (commercial included)	[79:19:2]	16/1000 sq. ft., 200/acre* **	12% (8:2)	12% (2:8)	9.0
Industrial Park (no commercial)		8/1000 sq. ft., 80/acre**	11% (9:1)	12% (2:8)	
Industrial Plant (multiple shifts)	[92:5:3]	10/1000 sq. ft., 120/acre*	14% (8:2)	15% (3:7)	11.7
Manufacturing/Assembly		4/1000 sq. ft., 50/acre**	19% (9:1)	20% (2:8)	
Warehousing		5/1000 sq. ft., 60/acre**	13% (7:3)	15% (4:6)	
Storage		2/1000 sq. ft., 0.2/vault, 30/acre*	8% (5:5)	9% (5:5)	
Science Research & Development		8/1000 sq. ft., 80/acre*	16% (9:1)	14% (1:9)	
Landfill & Recycling Center		6/acre	11% (5:5)	10% (4:6)	

(OVER)

MEMBER AGENCIES: Cities of Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista and County of San Diego.
ADVISORY/LIAISON MEMBERS: California Department of Transportation, County Water Authority, U.S. Department of Defense, S.D. Unified Port District and Tijuana/Baja California.

LAND USE	TRIP CATEGORIES (PRIMARY:DIVERTED:PASS-BY)[a]	ESTIMATED WEEKDAY VEHICLE TRIP GENERATION RATE (DRIVEWAY)	HIGHEST PEAK HOUR % (plus IN:OUT ratio) Between 8:00-9:30 A.M.		Between 3:00-5:30 P.M.		TRIP LENGTH (Miles)[f]
LIBRARY	[44:44:12]	50/1000 sq. ft., 400/acre[b]	2%	(7:3)	10%	(5:5)	3.0
LODGING	[58:30:4]						7.6
Hotel (w/conventions facilities/restaurant)		10/occupied room, 300/acre	8%	(5:4)	8%	(6:4)	
Motel		8/occupied room, 200/acre[c]	8%	(4:6)	8%	(6:4)	
Resort Hotel		8/occupied room, 100/acre[c]	8%	(6:4)	7%	(4:6)	
Business Hotel		7/occupied room[b]	8%	(4:6)	8%	(6:4)	
MILITARY	[82:16:2]	2.5/military & civilian personnel[c]	9%	(9:1)	10%	(2:8)	11.2
OFFICE							
Standard Commercial Office (less than 100,000 sq. ft.)	[77:19:4]	20/1000 sq. ft.,[e] 300/acre[c]	14%	(9:1)	13%	(2:8)	8.8
Large (High-Rise) Commercial Office (more than 100,000 sq. ft., 6+ stories)	[82:15:3]	17/1000 sq. ft.,[e] 500/acre[c]	13%	(8:1)	14%	(2:8)	10.0
Office Park (400,000+ sq. ft.)		12/1000 sq.ft., 200/acre[c] [b]	13%	(9:1)	13%	(2:8)	
Single Tenant Office		14/1000 sq. ft., 100/acre[c]	15%	(9:1)	15%	(2:8)	8.8
Corporate Headquarters		7/1000 sq. ft., 110/acre[c]	17%	(9:1)	10%	(1:9)	
Government (Civic Center)	[50:34:16]	30/1000 sq. ft.[b]	9%	(9:1)	12%	(3:7)	6.0
Post Office							
Central/Walk-In Only		90/1000 sq. ft.[b]	5%		7%		
Community (not including mail drop lane)		200/1000 sq. ft., 1300/acre[c]	9%	(5:4)	9%	(5:5)	
Community (w/mail drop lane)		300/1000 sq. ft., 2000/acre[c]	7%	(5:5)	10%	(5:5)	
Mail Drop Lane only		1500 (750 one-way)/lane[c]	7%	(5:5)	12%	(5:5)	
Department of Motor Vehicles		180/1000 sq. ft., 900/acre[b]	6%	(5:4)	10%	(4:6)	
Medical-Dental	[80:30:10]	50/1000 sq. ft., 500/acre[c]	6%	(8:2)	11%	(3:7)	6.4
PARKS	[86:28:6]		4%		8%		5.4
City (developed w/meeting rooms and sports facilities)		50/acre[c]	13%	(5:5)	9%	(5:5)	
Regional (developed)		20/acre[c]					
Neighborhood/County (undeveloped)		5/acre (add for specific sport uses), 8/picnic site[c] [b]					
State (average 1000 acres)		1/acre, 10/picnic site[b]					
Amusement (Theme)		80/acre, 130/acre (summer only)[b]			6%	(0:4)	
San Diego Zoo		115/acre[c]					
Sea World		80/acre[c]					
RECREATION							6.3
Beach, Ocean or Bay	[52:39:9]	600/1000 ft. shoreline, 60/acre[c]					
Beach, Lake (fresh water)		50/1000 ft. shoreline, 5/acre[c]					
Bowling Center		30/1000 sq. ft., 300/acre, 30/lane[b]	7%	(7:3)	11%	(4:6)	
Campground		4/campsite[b]	4%		8%		
Golf Course		7/acre, 40/hole, 700/course[c] [b]	7%	(6:2)	8%	(3:7)	
Driving Range only		70/acre, 14/tee box[c]	3%	(7:3)	8%	(5:5)	
Marinas		4/berth, 20/acre[c] [b]	3%	(3:7)	7%	(6:4)	
Multi-purpose (miniature golf, video arcade, batting cage, etc.)		80/acre	2%		6%		
Racquetball/Health Club		30/1000 sq. ft., 300/acre, 40/court[c]	4%	(6:4)	9%	(6:4)	
Tennis Courts		16/acre, 30/court[b]	6%		11%	(5:5)	
Sports Facilities							
Outdoor Stadium		50/acre, 0.2/seat[c]					
Indoor Arena		30/acre, 0.1/seat[c]					
Racetrack		40/acre, 0.6 seat[c]					
Theaters (multiplex w/matinees)	[56:17:17]	80/1000 sq. ft., 1.5/seat, 360/screen[c]	1/3%		8%	(6:4)	6.1
RESIDENTIAL	[68:11:3]						7.9
Estate, Urban or Rural (average 1-2 DU/acre)		12/dwelling unit[c] [a]	8%	(3:7)	10%	(7:3)	
Single Family Detached (average 3-6 DU/acre)		10/dwelling unit[c] [a]	8%	(3:7)	10%	(7:3)	
Condominium (for any multi-family 6-20 DU/acre)		8/dwelling unit[c] [a]	5%	(2:8)	10%	(7:3)	
Apartment (for any multi-family units more than 20 DU/acre)		6/dwelling unit[c] [a]	6%	(3:5)	9%	(7:3)	
Military Housing (all-base, multi-family)							
(less than 6 DU/acre)		8/dwelling unit	7%	(3:7)	8%	(6:4)	
(6-20 DU/acre)		6/dwelling unit	7%	(3:7)	8%	(6:4)	
Mobile Home							
Family		5/dwelling unit, 40/acre[c]	8%	(3:7)	11%	(6:4)	
Adults Only		3/dwelling unit, 20/acre[c]	9%	(3:7)	10%	(5:4)	
Retirement Community		4/dwelling unit[b]	5%	(4:6)	7%	(6:4)	
Congregate Care Facility		2.5/dwelling unit[b]	4%	(0:4)	6%	(5:5)	
RESTAURANT[g]	[51:37:12]						4.7
Quality		100/1000 sq. ft., 3/seat, 500/acre[c] [b]	1%	(5:4)	8%	(7:3)	
Sit-down, high turnover		160/1000 sq. ft., 6/seat, 1000/acre[c] [b]	8%	(5:5)	8%	(6:4)	
Fast Food (w/drive-through)		650/1000 sq. ft., 20/seat, 3000/acre[c] [b]	7%	(5:5)	7%	(5:5)	
Fast Food (without drive-through)		700/1000 sq. ft.[b]	5%	(6:4)	7%	(5:5)	
Delicatessen (7am-4pm)		150/1000 sq. ft., 11/seat[c]	9%	(6:4)	3%	(3:7)	
TRANSPORTATION							
Bus Depot		26/1000 sq. ft.[b]					
Truck Terminal		10/1000 sq. ft., 7/bay, 80/acre[b]	9%	(4:6)	8%	(5:5)	
Waterport/Marine Terminal		170/berth, 12/acre[b]					
Transit Station (Light Rail w/parking)		300/acre, 2 1/3/parking space (4/occupied)[b]	14%	(7:3)	15%	(3:7)	
Park & Ride Lots		400/acre (600/paved acre), 5/parking space (8/occupied)[b]	14%	(7:3)	15%	(3:7)	

[a] Primary source: *San Diego Traffic Generators.*

[b] Other sources: *ITE Trip Generation Report (5th Edition),* Trip Generation Rates (other agencies and publications), various SANDAG & CALTRANS studies, reports and estimates.

[c] Trip category percentage ratios are daily from local household surveys, often cannot be applied to very specific land uses, and do not include non-resident drivers (draft SANDAG *Analysis of Trip Diversion,* revised November, 1990):
PRIMARY - one trip directly between origin and primary destination.
DIVERTED - linked trip (having one or more stops along the way to a primary destination) whose distance compared to direct distance ≥ 1 mile.
PASS-BY - undiverted or diverted < 1 mile.

[d] Trip lengths are average weighted for all trips to and from general land use site. (All trips system-wide average length = 6.0 miles)

[e] Fitted curve equation: $Ln(T) = .0.602\ Ln(x) + 5.945$ } T = total trips, x = 1,000 sq. ft.

[f] Fitted curve equation: $Ln(T) = 0.769\ Ln(x) + 3.960$ }

[g] Fitted curve equation: $t = -2.159\ Ln(d) + 12.06$ t = trips/DU, d = density (DU/acre), DU = dwelling unit

[h] Suggested PASS-BY (undiverted or diverted < 1 mile) percentages for trip rate reductions only during P.M. peak period (based on combination of local data/review and Other sources[b]):

COMMERCIAL/RETAIL	
Regional Shopping Center	20%
Community " "	30%
Neighborhood " "	40%
Specialty Retail/Strip Commercial (other)	10%
Supermarket	40%
Convenience Market	50%
Discount Club/Store	20%
FINANCIAL	
Bank	25%
AUTOMOBILE	
Gasoline Station	50%
RESTAURANT	
Quality	10%
Sit-down high turnover	20%
Fast Food	40%

[i] Trip Reductions - In order to help promote regional "smart growth" policies, and acknowledge San Diego's expanding mass transit system, consider vehicle trip rate reductions (with proper documentation and necessary adjustments for peak periods). The following are some examples:

(1) A 5% daily trip reduction for land uses with transit access or near transit stations accessible within 1/4 mile.

(2) Up to 10% daily trip reduction for mixed-use developments where residential and commercial retail are combined (demonstrate mode-split of walking trips to replace vehicular trips).

APPENDIX B

EXISTING TRAFFIC COUNTS

&

SEASONAL GROWTH CALCULATIONS

&

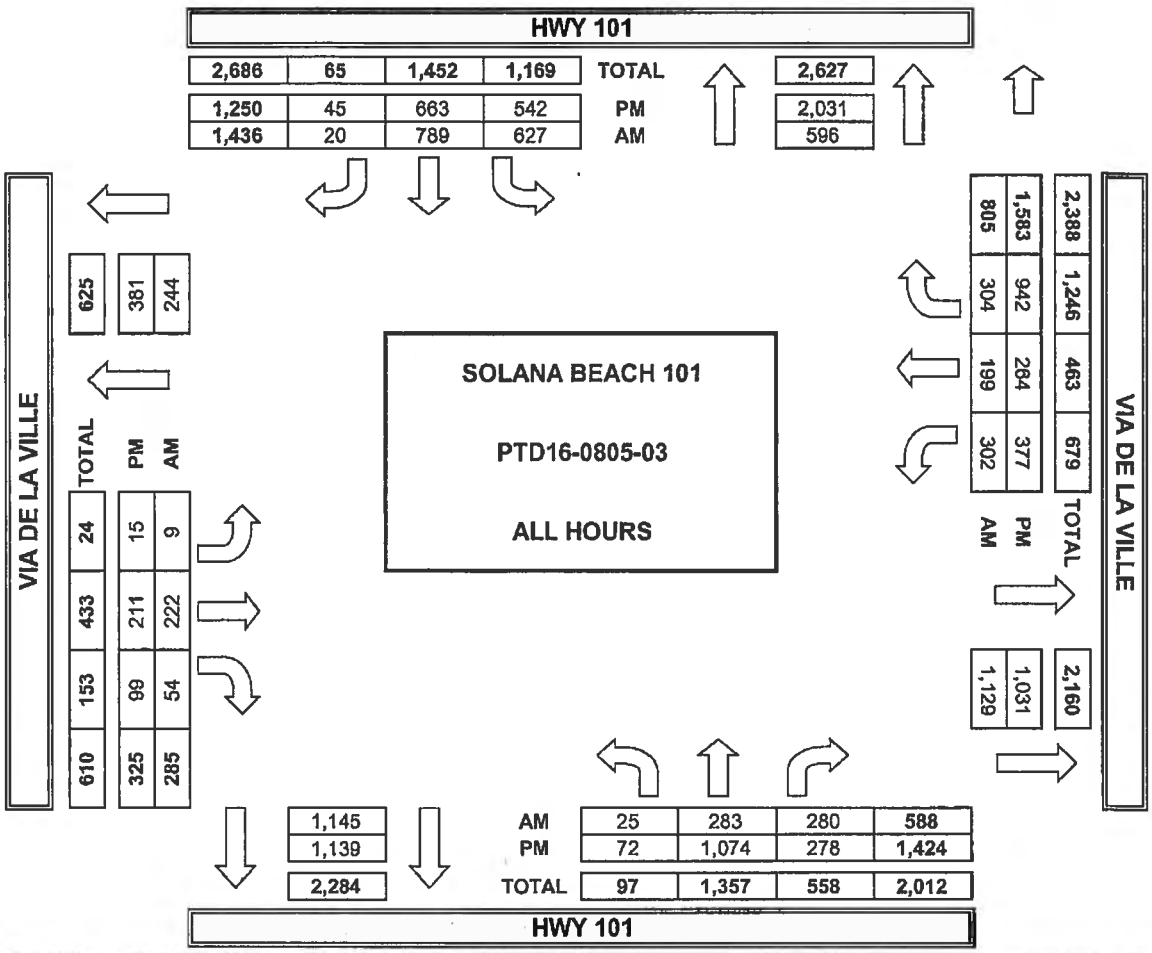
EIR FOR DEL MAR FAIRGROUNDS MASTER PLAN

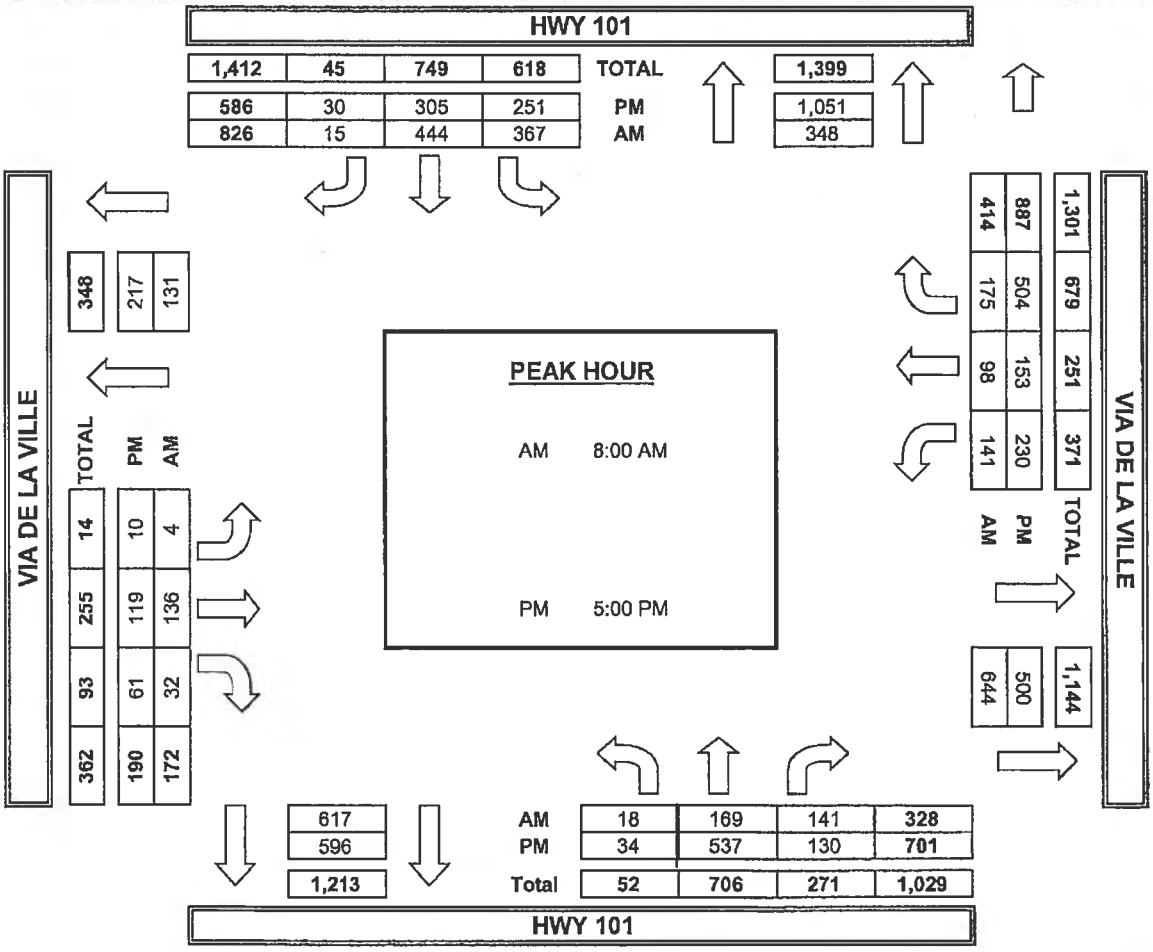
&

PEMS GRAPH + DATA

PACIFIC TECHNICAL DATA

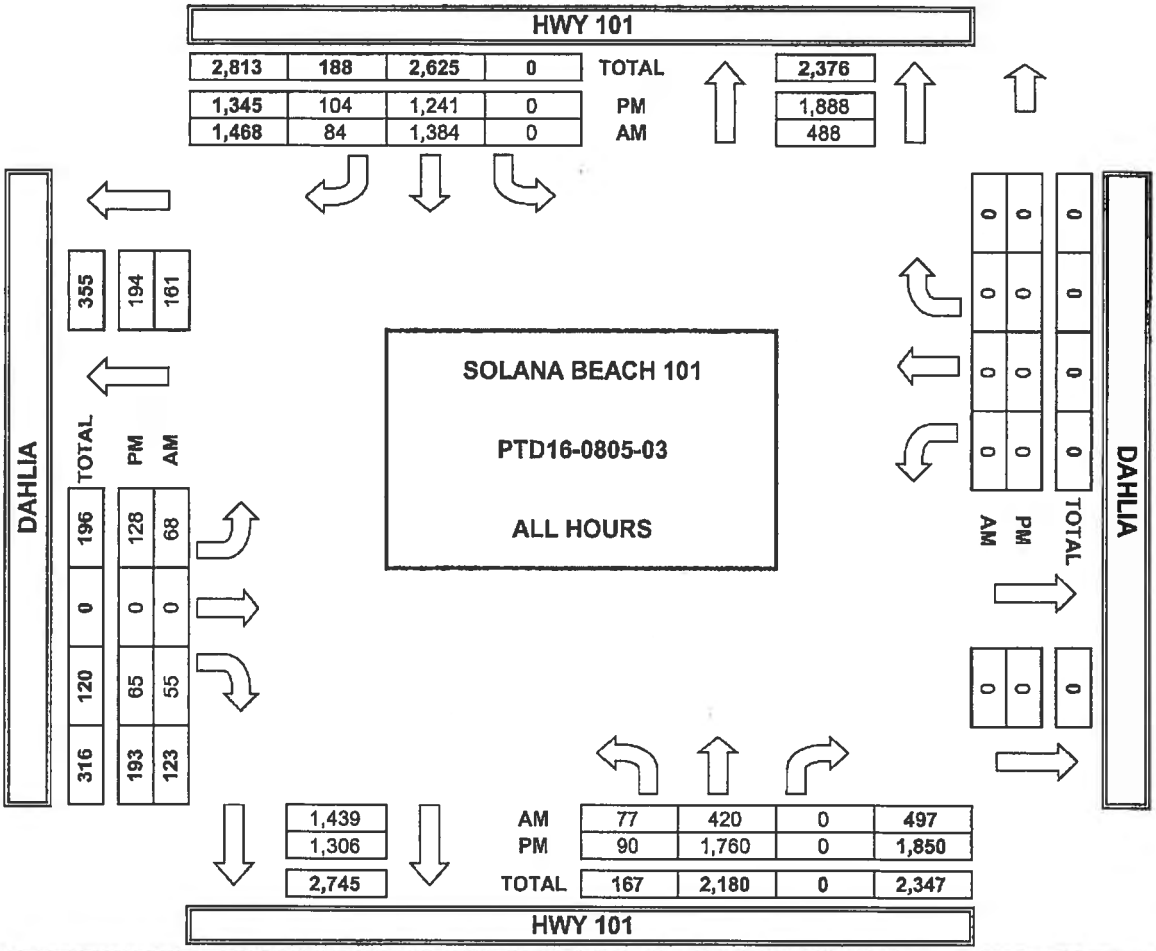
TURNING MOVEMENT COUNTS

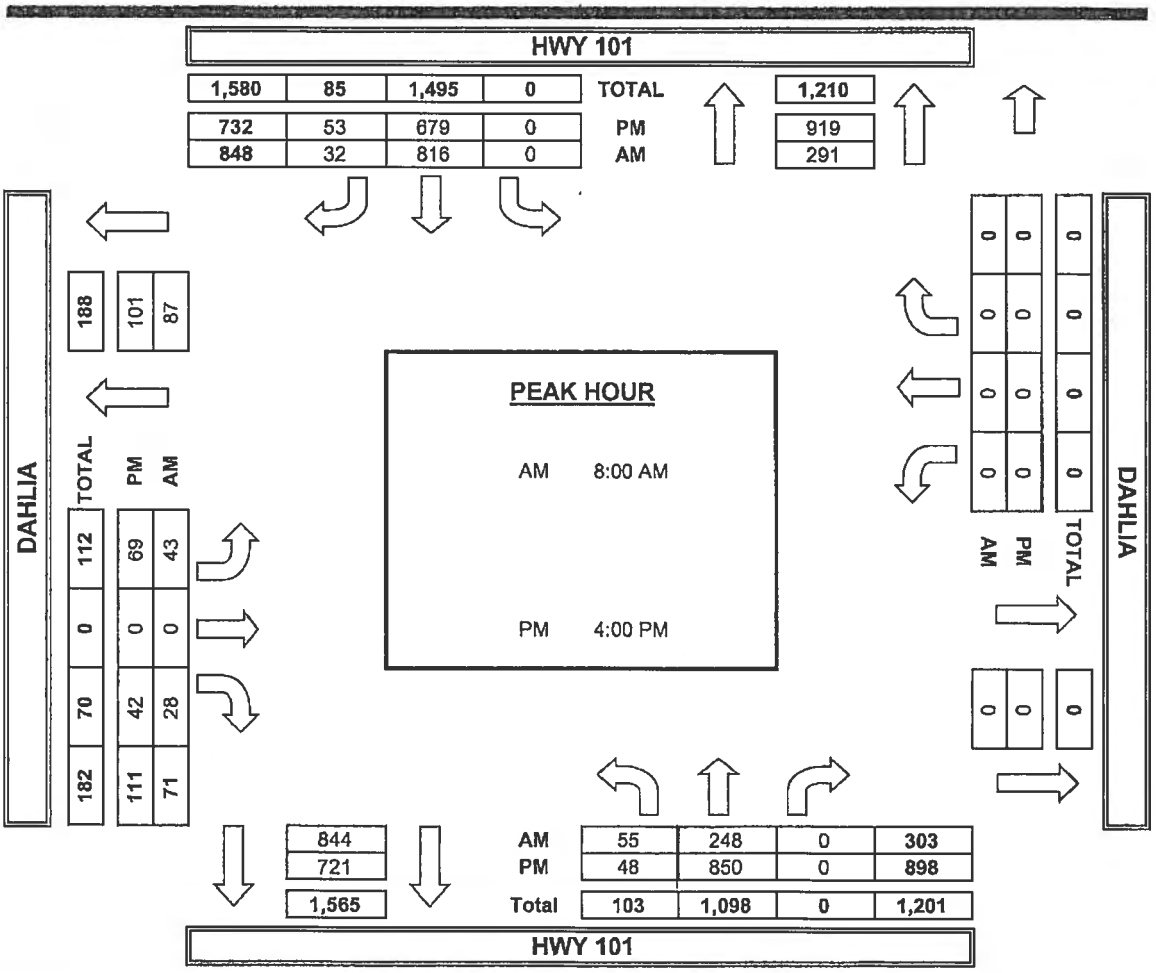




PACIFIC TECHNICAL DATA

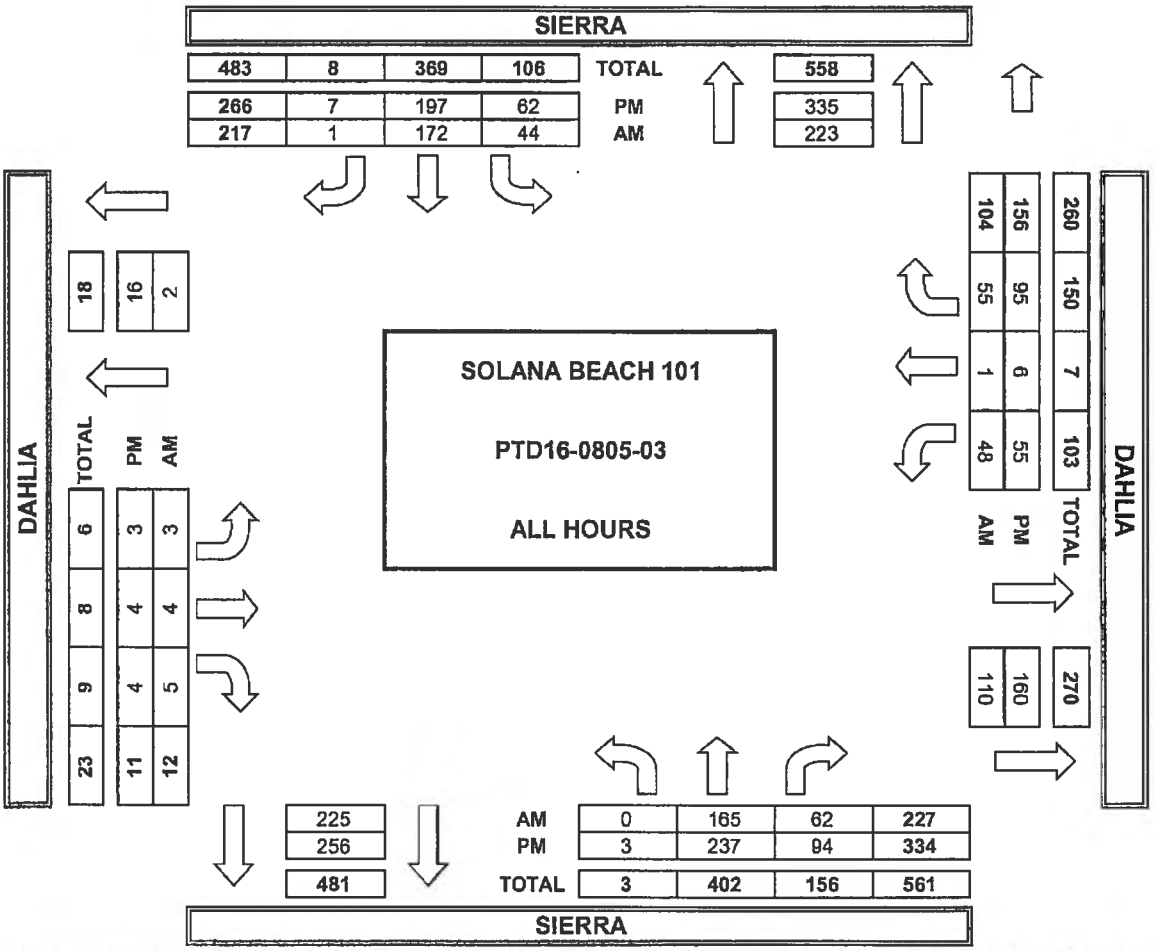
TURNING MOVEMENT COUNTS

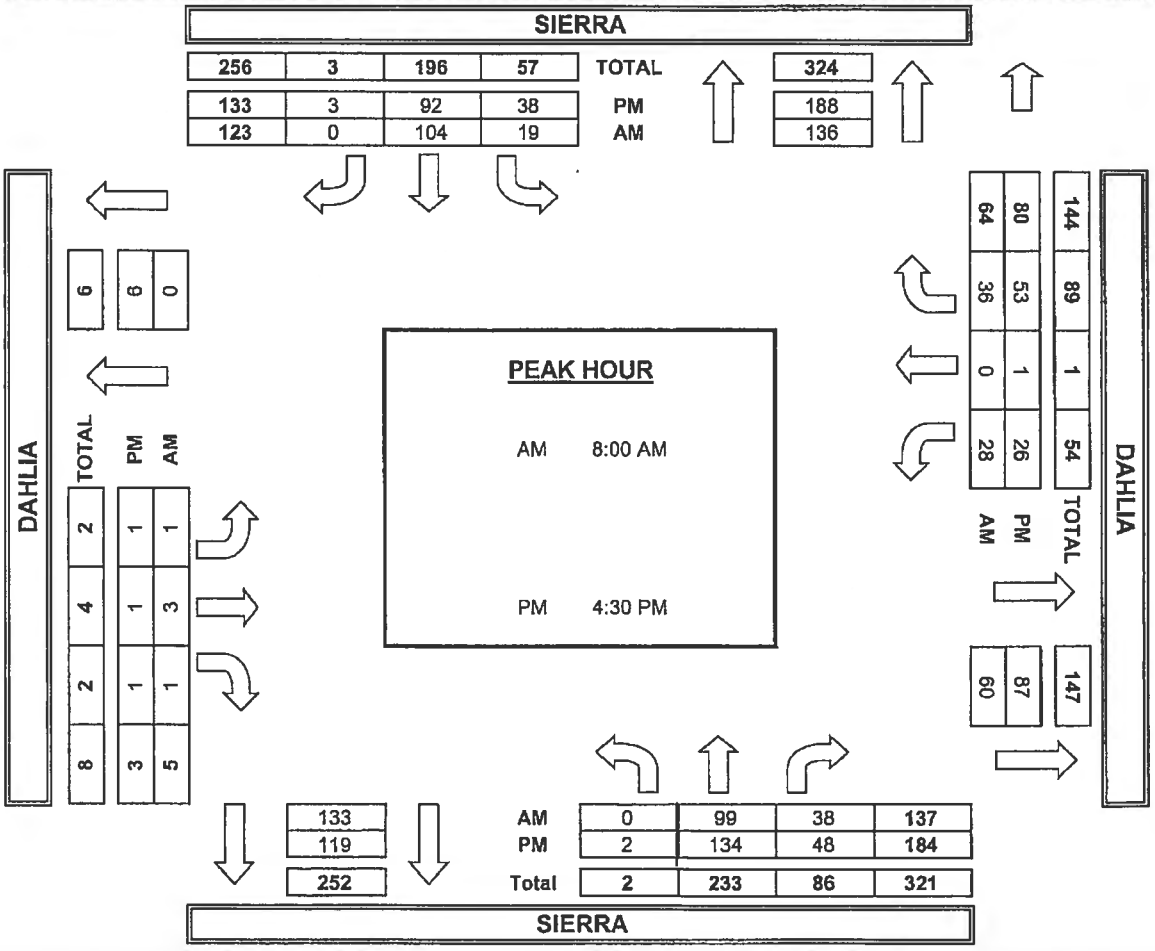




PACIFIC TECHNICAL DATA

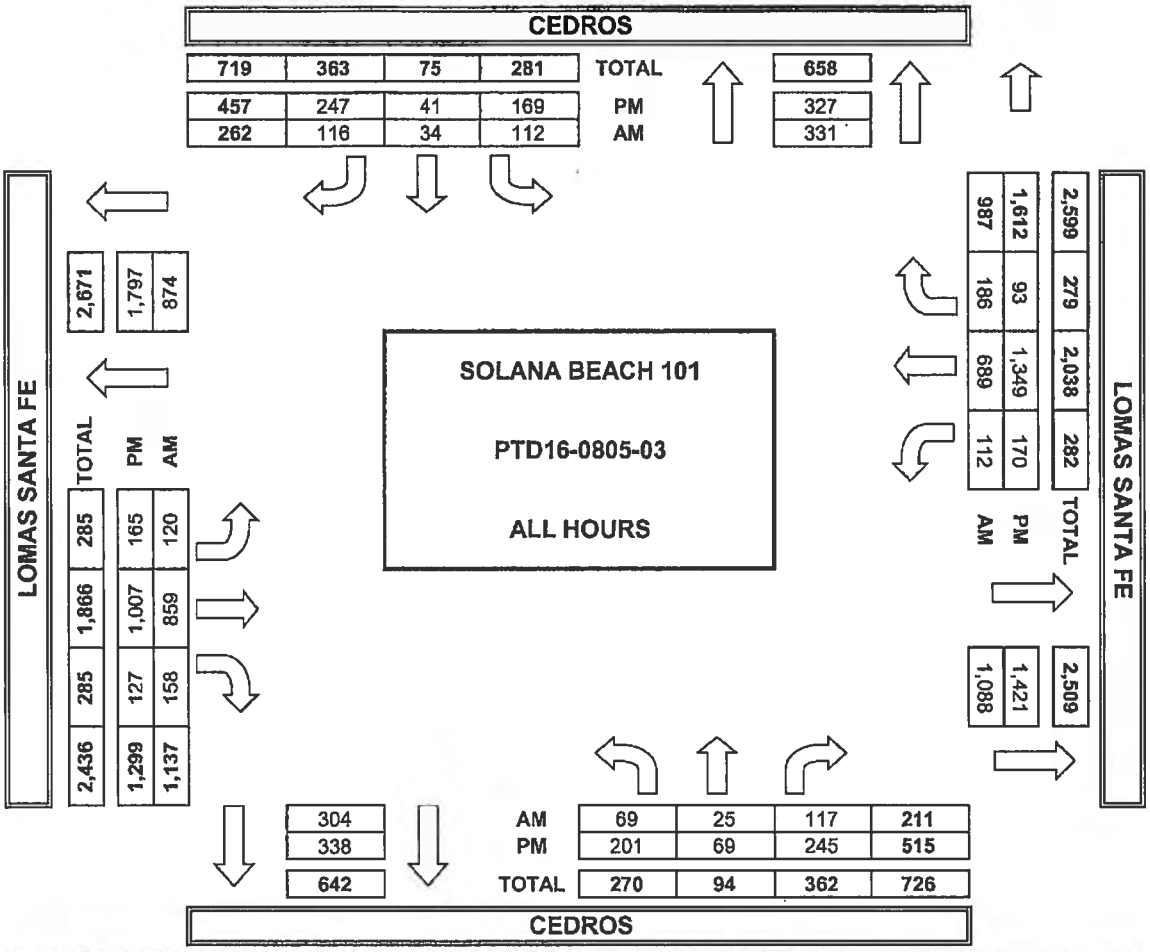
TURNING MOVEMENT COUNTS

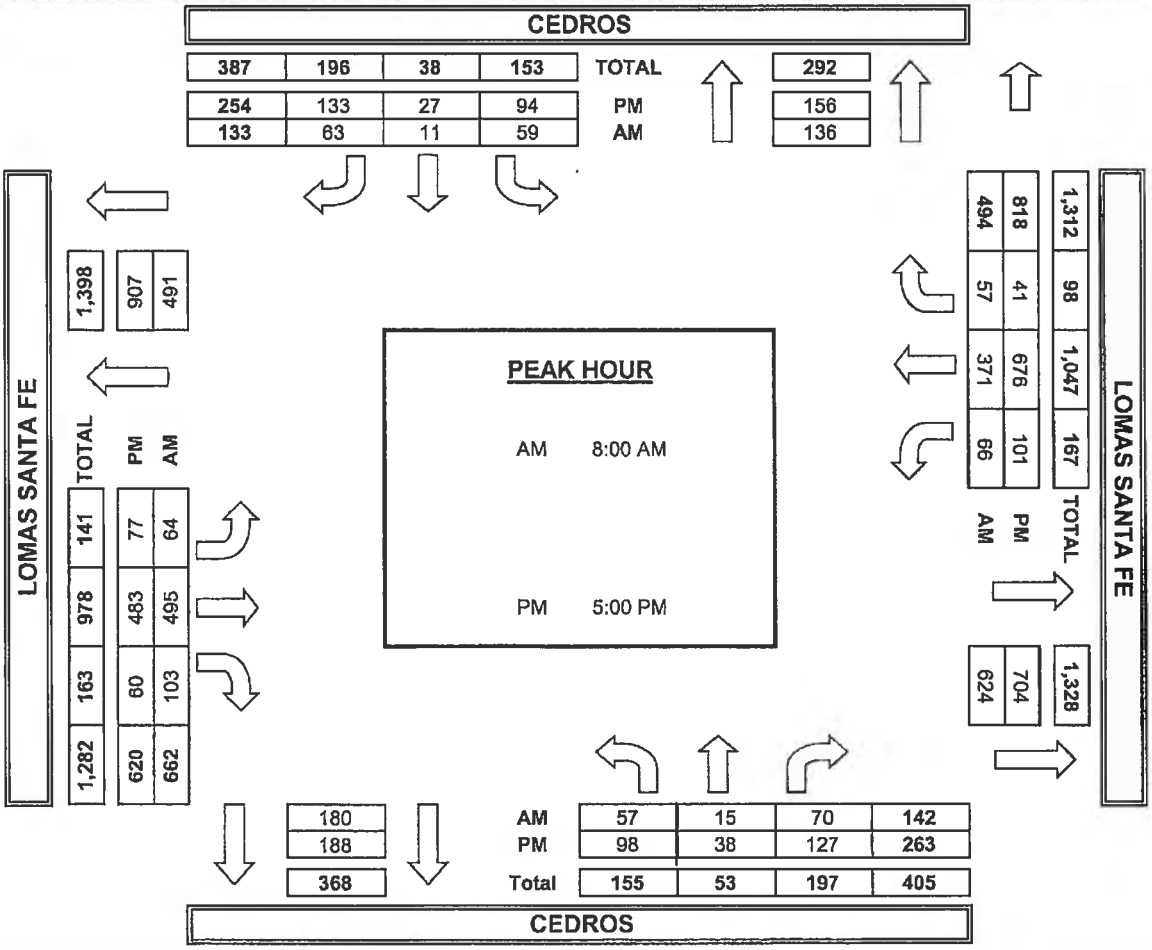




PACIFIC TECHNICAL DATA

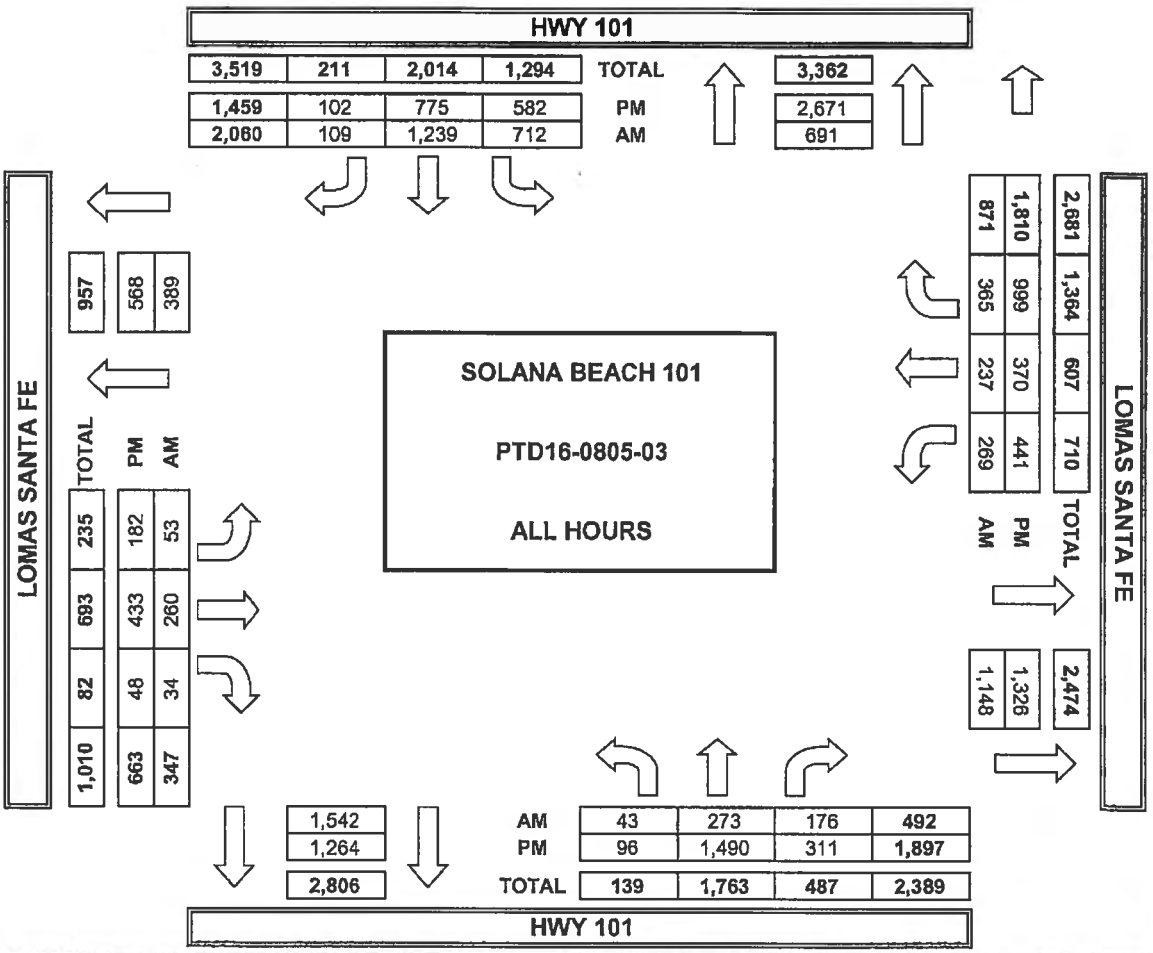
TURNING MOVEMENT COUNTS

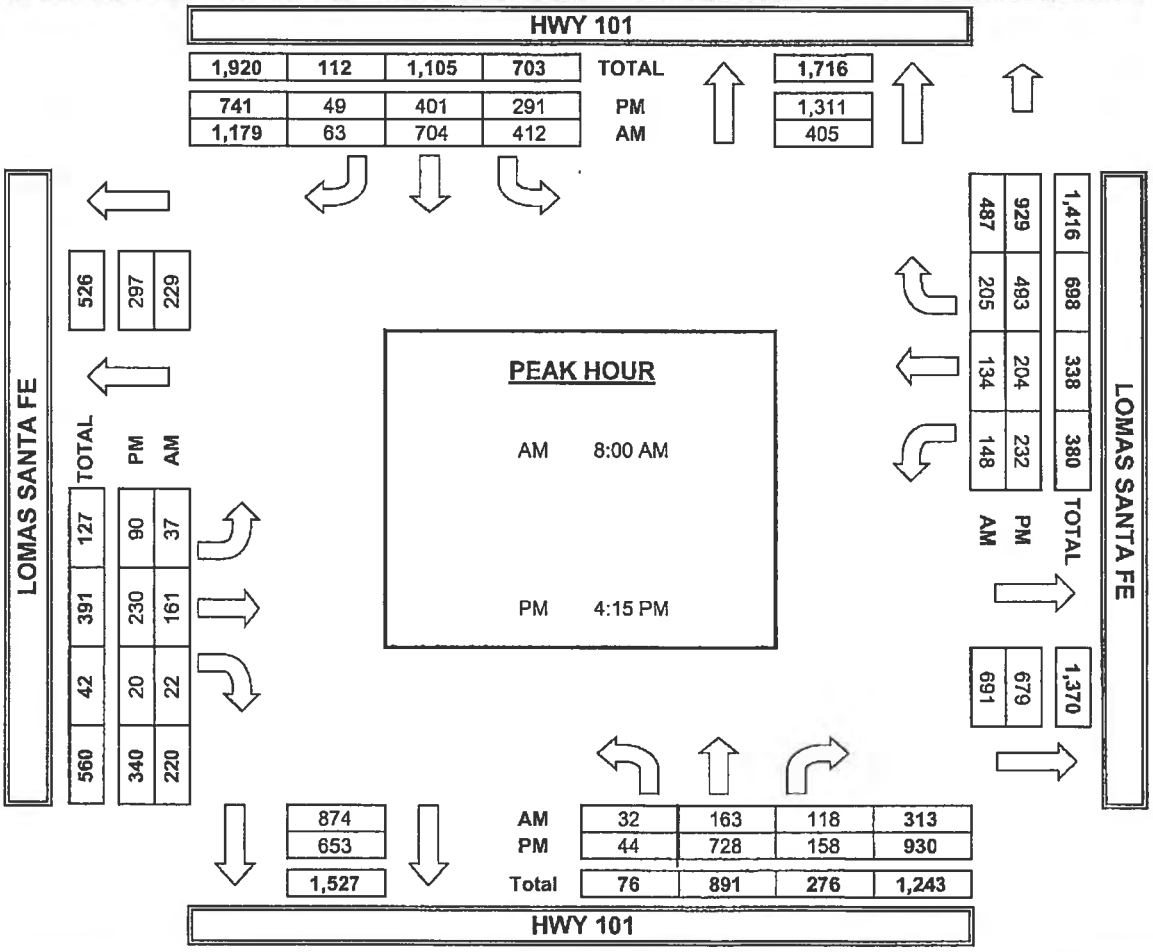




PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





WEDNESDAY - AUGUST 3, 2016 CITY: SOLANA BEACH 101 PROJECT: PTD16-0805-03

SIERRA - PLAZA TO DAHLIA

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	2		2					12:00	34		31				
00:15	1		2					12:15	30		15				
00:30	0		1					12:30	57		45				
00:45	1	4	1	6			10	12:45	60	181	28	119			300
01:00	2		0					13:00	47		38				
01:15	0		2					13:15	71		30				
01:30	0		1					13:30	38		32				
01:45	1	3	2	5			8	13:45	56	212	24	124			336
02:00	2		4					14:00	51		23				
02:15	0		1					14:15	55		30				
02:30	1		2					14:30	50		31				
02:45	2	5	1	8			13	14:45	33	189	41	125			314
03:00	1		0					15:00	37		38				
03:15	3		0					15:15	52		36				
03:30	0		1					15:30	53		36				
03:45	2	6	2	3			9	15:45	70	212	31	141			353
04:00	1		2					16:00	35		30				
04:15	0		1					16:15	33		31				
04:30	0		2					16:30	60		38				
04:45	2	3	1	6			9	16:45	40	168	31	130			298
05:00	1		0					17:00	35		35				
05:15	4		2					17:15	44		30				
05:30	4		3					17:30	41		35				
05:45	5	14	1	6			20	17:45	39	159	31	131			290
06:00	3		9					18:00	45		37				
06:15	5		8					18:15	54		27				
06:30	9		11					18:30	42		28				
06:45	8	25	12	40			65	18:45	27	168	25	117			285
07:00	20		15					19:00	28		25				
07:15	18		28					19:15	21		19				
07:30	21		26					19:30	24		20				
07:45	33	92	33	102			194	19:45	26	99	28	92			191
08:00	35		31					20:00	17		28				
08:15	28		25					20:15	15		9				
08:30	31		26					20:30	14		8				
08:45	35	129	33	115			244	20:45	16	62	13	58			120
09:00	38		33					21:00	10		7				
09:15	25		40					21:15	12		19				
09:30	21		28					21:30	19		16				
09:45	22	106	21	122			228	21:45	17	58	12	54			112
10:00	26		29					22:00	7		8				
10:15	23		33					22:15	8		5				
10:30	33		32					22:30	9		3				
10:45	38	120	32	126			246	22:45	6	30	5	21			51
11:00	28		28					23:00	2		2				
11:15	44		26					23:15	1		0				
11:30	35		22					23:30	2		1				
11:45	42	149	36	112			261	23:45	0	5	1	4			9
Total Vol.		656		651			**1307**			1543		1116			**2659**

Daily Totals

NB	SB	EB	WB	Combined
2199	1767			**3966**

	AM			PM		
Split %	50.2%	49.8%	**33.0%**	58.0%	42.0%	**67.0%**
Peak Hour	11:45	08:45	**11:45**	12:30	14:45	**12:30**
Volume	163	134	**290**	235	151	**376**
P.H.F.	0.71	0.84	**0.71**	0.88	0.92	**0.92**

PACIFIC TECHNICAL DATA

WEDNESDAY - AUGUST 3, 2016 CITY: SOLANA BEACH 101 PROJECT: PTD16-0805-03

HWY 101 - LOMAS SANTA FE TO DAHLIA

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	9		10					12:00	125		189				
00:15	6		14					12:15	143		169				
00:30	4		6					12:30	141		200				
00:45	3	22	3	33			55	12:45	142	551	151	709			1260
01:00	4		6					13:00	164		124				
01:15	2		5					13:15	144		181				
01:30	4		2					13:30	133		196				
01:45	0	10	4	17			27	13:45	127	568	197	698			1266
02:00	1		3					14:00	136		197				
02:15	2		3					14:15	127		153				
02:30	2		0					14:30	142		175				
02:45	2	7	1	7			14	14:45	151	556	145	670			1226
03:00	1		1					15:00	154		149				
03:15	2		3					15:15	155		185				
03:30	0		1					15:30	189		177				
03:45	4	7	2	7			14	15:45	220	718	168	679			1397
04:00	3		3					16:00	215		185				
04:15	1		5					16:15	201		210				
04:30	3		5					16:30	250		188				
04:45	1	8	8	21			29	16:45	237	903	144	727			1630
05:00	6		6					17:00	243		161				
05:15	3		5					17:15	228		184				
05:30	9		17					17:30	249		141				
05:45	8	26	35	63			89	17:45	234	954	145	631			1585
06:00	18		31					18:00	250		150				
06:15	20		63					18:15	244		141				
06:30	27		53					18:30	213		148				
06:45	32	97	87	234			331	18:45	192	899	111	550			1449
07:00	43		104					19:00	146		127				
07:15	40		151					19:15	124		94				
07:30	54		169					19:30	97		109				
07:45	60	197	208	632			829	19:45	109	476	93	423			899
08:00	88		181					20:00	105		96				
08:15	71		210					20:15	106		83				
08:30	55		207					20:30	76		62				
08:45	78	292	254	852			1144	20:45	57	344	68	309			653
09:00	88		182					21:00	43		61				
09:15	102		181					21:15	48		59				
09:30	89		175					21:30	42		47				
09:45	77	356	188	726			1082	21:45	55	188	53	220			408
10:00	100		141					22:00	33		32				
10:15	108		190					22:15	32		36				
10:30	121		181					22:30	30		17				
10:45	115	444	188	700			1144	22:45	22	117	25	110			227
11:00	140		144					23:00	12		19				
11:15	152		187					23:15	14		8				
11:30	143		173					23:30	7		10				
11:45	150	585	197	701			1286	23:45	8	41	5	42			83
Total Vol.		2051		3993			**6044**			6315		5768			**12083**

Daily Totals

NB	SB	EB	WB	Combined
8366	9761			**18127**

	AM			PM		
Split %	33.9%	66.1%	**33.3%**	52.3%	47.7%	**66.7%**
Peak Hour	11:00	08:15	**11:15**	17:30	13:15	**15:45**
Volume	585	853	**1316**	977	771	**1637**
P.H.F.	0.96	0.84	**0.95**	0.98	0.98	**0.93**

PACIFIC TECHNICAL DATA

WEDNESDAY - AUGUST 3, 2016 CITY: SOLANA BEACH 101 PROJECT: PTD16-0805-03

HWY 101 - VIA DE LA VILLE TO DAHLIA

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	9		8					12:00	123		180				
00:15	5		13					12:15	152		189				
00:30	6		6					12:30	143		207				
00:45	4	24	3	30			54	12:45	145	563	158	734			1297
01:00	1		4					13:00	162		122				
01:15	3		7					13:15	134		182				
01:30	5		2					13:30	144		200				
01:45	1	10	4	17			27	13:45	134	574	178	682			1256
02:00	2		2					14:00	123		165				
02:15	2		4					14:15	144		158				
02:30	3		0					14:30	140		195				
02:45	1	8	0	6			14	14:45	163	570	136	654			1224
03:00	3		1					15:00	165		155				
03:15	3		2					15:15	168		194				
03:30	1		1					15:30	182		166				
03:45	4	11	3	7			18	15:45	242	757	171	686			1443
04:00	3		3					16:00	234		188				
04:15	4		7					16:15	205		205				
04:30	4		5					16:30	254		177				
04:45	9	20	12	27			47	16:45	258	951	160	730			1681
05:00	10		5					17:00	246		144				
05:15	12		10					17:15	251		168				
05:30	9		17					17:30	251		127				
05:45	33	64	26	58			122	17:45	261	1009	158	597			1606
06:00	30		34					18:00	269		155				
06:15	30		50					18:15	252		126				
06:30	28		65					18:30	233		139				
06:45	52	140	84	233			373	18:45	209	963	143	563			1526
07:00	43		108					19:00	134		138				
07:15	45		148					19:15	131		122				
07:30	70		174					19:30	94		107				
07:45	95	253	170	600			853	19:45	101	460	105	472			932
08:00	86		193					20:00	87		98				
08:15	76		186					20:15	90		99				
08:30	78		204					20:30	70		75				
08:45	89	329	229	812			1141	20:45	48	295	86	358			653
09:00	100		177					21:00	37		62				
09:15	123		175					21:15	38		70				
09:30	95		197					21:30	37		56				
09:45	87	405	181	730			1135	21:45	52	164	59	247			411
10:00	101		147					22:00	28		42				
10:15	114		195					22:15	37		47				
10:30	130		196					22:30	26		18				
10:45	123	468	151	689			1157	22:45	19	110	33	140			250
11:00	149		153					23:00	14		22				
11:15	156		166					23:15	14		14				
11:30	146		194					23:30	5		11				
11:45	168	619	158	671			1290	23:45	7	40	7	54			94
Total Vol.		2351		3880			**6231**			6456		5917			**12373**

Daily Totals

NB	SB	EB	WB	Combined
8807	9797			**18604**

	AM			PM		
Split %	37.7%	62.3%	**33.5%**	52.2%	47.8%	**66.5%**
Peak Hour	11:00	08:00	**11:45**	17:30	15:45	**16:00**
Volume	619	812	**1320**	1033	741	**1681**
P.H.F.	0.92	0.89	**0.94**	0.98	0.90	**0.98**

PACIFIC TECHNICAL DATA

WEDNESDAY - AUGUST 3, 2016 CITY: SOLANA BEACH 101 PROJECT: PTD16-0805-03

DAHLIAH - SIERRA TO HWY 101

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			0		4			12:00			28		26		
00:15			4		2			12:15			21		22		
00:30			1		0			12:30			28		20		
00:45			0	5	2	8	13	12:45			24	101	28	96	197
01:00			1		0			13:00			25		22		
01:15			1		0			13:15			21		17		
01:30			1		0			13:30			21		22		
01:45			0	3	0	0	3	13:45			13	80	17	78	158
02:00			0		1			14:00			19		32		
02:15			1		1			14:15			14		26		
02:30			0		0			14:30			20		13		
02:45			0	1	1	3	4	14:45			22	75	28	99	174
03:00			0		0			15:00			11		16		
03:15			0		1			15:15			9		21		
03:30			0		0			15:30			34		24		
03:45			0	0	1	2	2	15:45			18	72	28	89	161
04:00			1		0			16:00			28		25		
04:15			1		0			16:15			20		26		
04:30			4		2			16:30			33		28		
04:45			2	8	3	5	13	16:45			25	106	20	99	205
05:00			3		1			17:00			26		25		
05:15			0		2			17:15			20		28		
05:30			2		1			17:30			18		18		
05:45			3	8	4	8	16	17:45			15	79	21	92	171
06:00			5		4			18:00			31		25		
06:15			4		4			18:15			20		14		
06:30			6		5			18:30			11		18		
06:45			10	25	3	16	41	18:45			29	91	10	67	158
07:00			7		9			19:00			20		15		
07:15			12		9			19:15			13		17		
07:30			17		18			19:30			11		8		
07:45			12	48	27	63	111	19:45			12	56	13	53	109
08:00			24		16			20:00			10		7		
08:15			18		21			20:15			20		14		
08:30			8		22			20:30			13		6		
08:45			11	61	22	81	142	20:45			10	53	5	32	85
09:00			16		14			21:00			9		6		
09:15			13		12			21:15			11		5		
09:30			23		16			21:30			4		4		
09:45			21	73	27	69	142	21:45			8	32	5	20	52
10:00			27		15			22:00			11		3		
10:15			19		27			22:15			4		5		
10:30			17		14			22:30			6		5		
10:45			15	78	26	82	160	22:45			2	23	1	14	37
11:00			20		20			23:00			3		2		
11:15			35		30			23:15			2		1		
11:30			44		25			23:30			2		1		
11:45			34	133	27	102	235	23:45			3	10	2	6	16
Total Vol.				443		439	**882**					778		745	**1523**

	AM			PM		
Daily Totals	NB	SB	EB	WB	**Combined**	
			1221	1184	**2405**	
Split %	50.2%	49.8%	**36.7%**	51.1%	48.9%	**63.3%**
Peak Hour	11:15	11:15	**11:15**	16:00	15:45	**15:45**
Volume	141	108	**249**	106	107	**206**
P.H.F.	0.80	0.90	**0.90**	0.80	0.96	**0.84**

PACIFIC TECHNICAL DATA

WEDNESDAY - AUGUST 3, 2016 CITY: SOLANA BEACH 101 PROJECT: PTD16-0805-03

VIA DE LA VILLE - CEDROS TO SOLANA CIR.

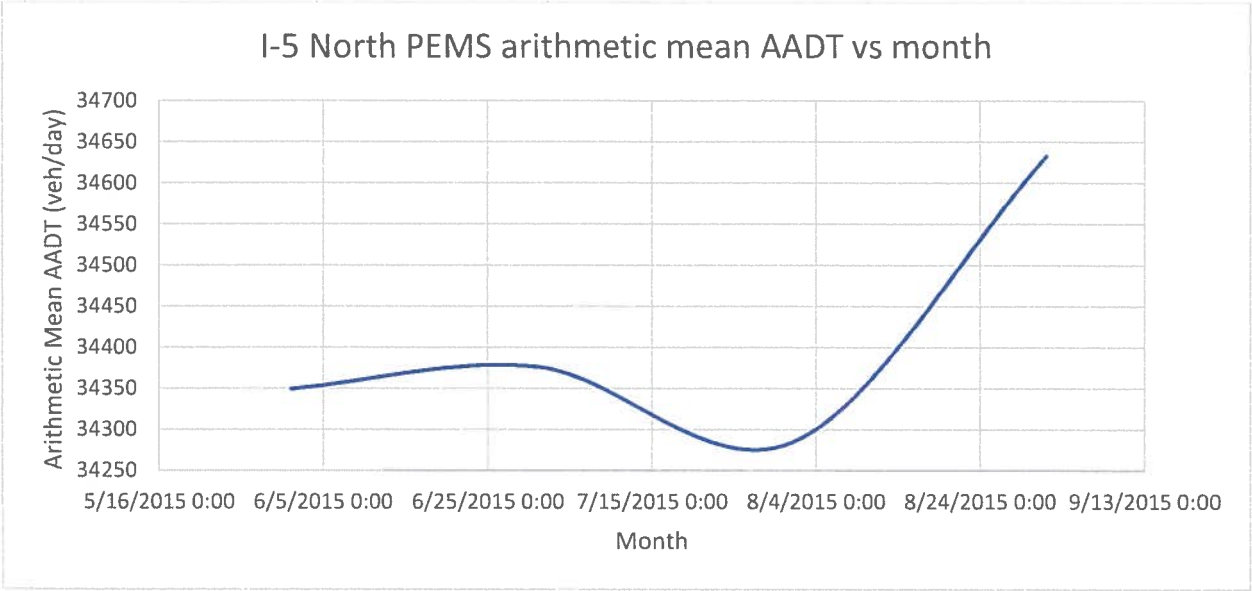
AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			10		10			12:00			166		181		
00:15			7		7			12:15			148		167		
00:30			7		9			12:30			164		168		
00:45			6	30	5	31	61	12:45			185	663	155	671	1334
01:00			4		5			13:00			153		139		
01:15			3		5			13:15			149		134		
01:30			5		8			13:30			179		146		
01:45			2	14	2	20	34	13:45			135	616	146	565	1181
02:00			1		3			14:00			169		124		
02:15			4		1			14:15			126		144		
02:30			2		4			14:30			156		125		
02:45			1	8	2	10	18	14:45			126	577	156	549	1126
03:00			1		3			15:00			144		159		
03:15			3		3			15:15			128		158		
03:30			6		2			15:30			157		159		
03:45			5	15	4	12	27	15:45			133	562	184	660	1222
04:00			4		4			16:00			134		186		
04:15			10		8			16:15			126		196		
04:30			7		7			16:30			136		191		
04:45			13	34	11	30	64	16:45			122	518	193	766	1284
05:00			6		9			17:00			130		200		
05:15			11		16			17:15			107		233		
05:30			14		16			17:30			107		244		
05:45			29	60	36	77	137	17:45			127	471	223	900	1371
06:00			38		43			18:00			132		273		
06:15			54		53			18:15			128		225		
06:30			64		69			18:30			120		204		
06:45			78	234	95	260	494	18:45			135	515	176	878	1393
07:00			71		68			19:00			127		130		
07:15			107		80			19:15			119		108		
07:30			152		129			19:30			101		94		
07:45			151	481	152	429	910	19:45			105	452	91	423	875
08:00			138		121			20:00			111		74		
08:15			154		116			20:15			110		82		
08:30			156		101			20:30			112		61		
08:45			170	618	131	469	1087	20:45			84	417	54	271	688
09:00			160		139			21:00			68		39		
09:15			139		149			21:15			72		53		
09:30			125		123			21:30			66		36		
09:45			169	593	130	541	1134	21:45			50	256	31	159	415
10:00			124		129			22:00			43		41		
10:15			134		142			22:15			45		34		
10:30			142		144			22:30			26		29		
10:45			124	524	166	581	1105	22:45			32	146	17	121	267
11:00			130		170			23:00			24		21		
11:15			170		190			23:15			25		12		
11:30			176		183			23:30			18		6		
11:45			130	606	172	715	1321	23:45			10	77	9	48	125
Total Vol.				3217		3175	**6392**					5270		6011	**11281**

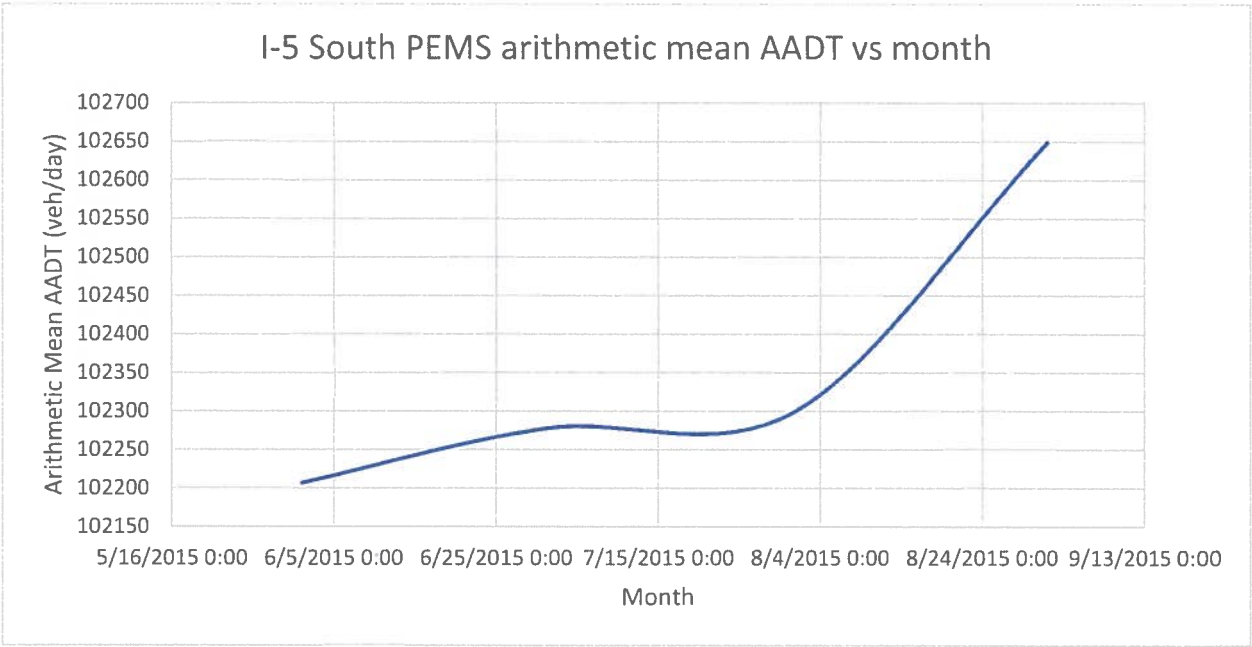
Daily Totals

NB	SB	EB	WB	Combined
		8487	9186	**17673**

	AM			PM		
Split %	50.3%	49.7%	**36.2%**	46.7%	53.3%	**63.8%**
Peak Hour	11:15	11:15	**11:15**	12:45	17:15	**17:30**
Volume	642	726	**1368**	666	973	**1459**
P.H.F.	0.91	0.96	**0.95**	0.90	0.89	**0.90**

PACIFIC TECHNICAL DATA


I-5 North PEMS arithmetic mean AADT vs month
Arithmetic Mean AADT (veh/day)
34700
34650
34600
34550
34500
34450
34400
34350
34300
34250
5/16/2015 0:00
6/5/2015 0:00
6/25/2015 0:00
7/15/2015 0:00
8/4/2015 0:00
8/24/2015 0:00
9/13/2015 0:00
Month


I-5 South PEMS arithmetic mean AADT vs month
Arithmetic Mean AADT (veh/day)
102700
102650
102600
102550
102500
102450
102400
102350
102300
102250
102200
102150
5/16/2015 0:00
6/5/2015 0:00
6/25/2015 0:00
7/15/2015 0:00
8/4/2015 0:00
8/24/2015 0:00
9/13/2015 0:00
Month

PeMS

Search

Freeway I5-N in District 11

Current Location

Maps Real-Time | Performance | Inventory

California

Freeway Details

Directional Distance	72.3 mi
Controllers	112
Stations	168
Detectors	545
Traffic Census Stations	176

Quick Links

View this page for another part of I5-N...

View this page for another freeway...

View opposite direction of travel

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Data Clearinghouse
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Transit PeMS User Manual
Lane Closure Manual
District TCR Training Guide
PeMS Forum (External Site)

Facilities & Devices | Performance | Data Quality | Configuration | Events

Performance > Planning Analysis > AADT

ABOUT THIS REPORT

From 05/2015 **To** 09/2015

Max Range: 10 years

VIEW TABLE | EXPORT TEXT | EXPORT to XLS

2822 488 0

Starting Month	Fwy	CA PM	Abs PM	VDS	Name	Type	Arithmetic Mean	ASTM Std 1442	Conv. AASHTO	Prov. AASHTO	Sum of 24 Annual Avg Hours	Mod. ASTM Std	Mod. Conv. AASHTO	Mod. Prov. AASHTO	% Data Used	K
05/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,601			39,574	41,337			39,574	44	2,411
06/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,557			39,416	41,152			39,416	50	2,404
07/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,582			40,179	41,046	41,105		40,179	56	2,401
08/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,527			40,223	40,871	40,844		40,223	60	2,388
09/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,305			39,922	40,526	40,399	40,241	39,922	65	2,383
05/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	19,155	19,101			19,193	19,101			48	1,313
06/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	19,126	19,057			19,171	19,057			45	1,312
07/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	19,076	19,018			19,133	19,018			43	1,307
08/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	18,969	18,951			19,035	18,951			39	1,296
09/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	18,880	18,810			18,893	18,810			41	1,294
05/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,716	27,655			27,881	27,655			46	1,710
06/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,753	27,699			27,892	27,699			48	1,710
07/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,714	27,664			27,845	27,664			48	1,705
08/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,678	27,645			27,780	27,645			47	1,704
09/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,662	27,581			27,703	27,581			47	1,702
05/01/2015 00:00:00	I5-N	2.285	2.20		5 NB @ Dairy Mart	Mainline	23,422	23,413			23,486	23,413	23,439	23,433	73	1,495
06/01/2015 00:00:00	I5-N	2.285	2.20		5 NB @ Dairy Mart	Mainline	23,380	23,414			23,455	23,414	23,398	23,393	73	1,491
07/01/2015 00:00:00	I5-N	2.285	2.20		5 NB @ Dairy Mart	Mainline	23,354	23,359			23,424	23,359	23,344	23,340	72	1,488

Starting Month	Fwy	CA PM	Abs PM	VDS	Name	Type	Arithmetic Mean	ASTM Std 1442	Conv. AASHTO	Prov. AASHTO	Sum of 24 Annual Avg Hours	Mod. ASTM Std	Mod. Conv. AASHTO	Mod. Prov. AASHTO	% Data Used	K
05/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,512	4,525	4,525	4,529	4,528	4,525	4,525	4,529	85	649
05/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	94,786	94,867	94,867	94,947	95,034	94,867	94,867	94,947	86	6,941
05/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,513	11,516	11,516	11,483	11,494	11,516	11,516	11,483	86	1,465
05/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,926	15,963	15,963	15,971	15,974	15,963	15,963	15,971	86	1,717
06/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,882	15,935	15,935	15,943	15,941	15,935	15,935	15,943	86	1,717
06/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,582	11,595	11,595	11,558	11,560	11,595	11,595	11,558	86	1,465
06/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	94,892	94,987	94,987	95,067	95,168	94,987	94,987	95,067	86	6,924
06/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,528	4,545	4,545	4,551	4,547	4,545	4,545	4,551	86	649
07/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	95,036	95,110	95,110	95,179	95,262	95,110	95,110	95,179	87	6,908
07/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,680	11,677	11,677	11,639	11,663	11,677	11,677	11,639	87	1,486
07/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,534	4,541	4,541	4,548	4,550	4,541	4,541	4,548	86	657
07/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,842	15,872	15,872	15,877	15,901	15,872	15,872	15,877	87	1,662
08/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,785	15,825	15,825	15,833	15,855	15,825	15,825	15,833	87	1,662
08/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,521	4,524	4,524	4,538	4,543	4,524	4,524	4,538	87	662
08/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,787	11,789	11,789	11,756	11,792	11,789	11,789	11,756	87	1,487
08/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	95,047	95,164	95,164	95,278	95,302	95,164	95,164	95,278	87	6,907
09/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,521	4,514	4,514	4,532	4,535	4,514	4,514	4,532	88	656
09/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,807	15,795	15,795	15,809	15,837	15,795	15,795	15,809	88	1,650
09/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	95,217	95,188	95,188	95,291	95,365	95,188	95,188	95,291	88	6,894
09/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,911	11,889	11,889	11,878	11,911	11,889	11,889	11,878	88	1,487
05/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,664	5,662	5,662	5,662	5,669	5,662	5,662	5,662	87	519
06/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,650	5,648	5,648	5,650	5,657	5,648	5,648	5,650	87	514
07/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,634	5,630	5,630	5,632	5,639	5,630	5,630	5,632	88	510
08/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,628	5,626	5,626	5,628	5,634	5,626	5,626	5,628	87	514
09/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,624	5,617	5,617	5,625	5,626	5,617	5,617	5,625	87	511
05/01/2015 00:00:00	I5-N	R37.37	37.26		LOMAS SANTA FE DR	On Ramp	4,705	4,729	4,729	4,740	4,745	4,729	4,729	4,740	86	614
05/01/2015 00:00:00	I5-N	R37.37	37.26		5N Lomas Santa Fe EB	Mainline	94,353	94,445	94,445	94,516	94,584	94,445	94,445	94,516	86	6,856
05/01/2015 00:00:00	I5-N	R37.37	37.26		LOMAS SANTA FE	Off Ramp	8,894	8,904	8,904	8,905	8,918	8,904	8,904	8,905	86	887

Search

Freeway I5-N in District 11

Current Location

Maps Real-Time | Performance | Inventory

California

Freeway Details

Directional Distance	72.3 mi
Controllers	112
Stations	168
Detectors	545
Traffic Census Stations	176

Quick Links

View this page for another part of I5-N...

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View opposite direction of travel

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Lane Closure Manual
District TCR Training Guide
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Facilities & Devices | Performance | Data Quality | Configuration | Events

Performance > Planning Analysis > AADT

ABOUT THIS REPORT

From 05/2015 To 09/2015

Max Range: 10 years

VIEW TABLE | EXPORT TEXT | EXPORT to XLS

2822 488 0

Starting Month	Fwy	CA PM	Abs PM	VDS	Name	Type	Arithmetic Mean	ASTM Std 1442	Conv. AASHTO	Prov. AASHTO	Sum of 24 Annual Avg Hours	Mod. ASTM Std	Mod. Conv. AASHTO	Mod. Prov. AASHTO	% Data Used	K
05/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,601			39,574	41,337			39,574	44	2,411
06/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,557			39,416	41,152			39,416	50	2,404
07/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,582			40,179	41,046	41,105		40,179	56	2,401
08/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,527			40,223	40,871	40,844		40,223	60	2,388
09/01/2015 00:00:00	I5-N	R.147	0.06		N/O CMNO DE LA PLAZA	Mainline	40,305			39,922	40,526	40,399	40,241	39,922	65	2,383
05/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	19,155	19,101			19,193	19,101			48	1,313
06/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	19,126	19,057			19,171	19,057			45	1,312
07/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	19,076	19,018			19,133	19,018			43	1,307
08/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	18,969	18,951			19,035	18,951			39	1,296
09/01/2015 00:00:00	I5-N	1.233	1.14		5 NB @ S. Ysidro	Mainline	18,880	18,810			18,893	18,810			41	1,294
05/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,716	27,655			27,881	27,655			46	1,710
06/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,753	27,699			27,892	27,699			48	1,710
07/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,714	27,664			27,845	27,664			48	1,705
08/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,678	27,645			27,780	27,645			47	1,704
09/01/2015 00:00:00	I5-N	1.502	1.41		N/O VIA DE SAN YSIDR	Mainline	27,662	27,581			27,703	27,581			47	1,702
05/01/2015 00:00:00	I5-N	2.285	2.20		5 NB @ Dairy Mart	Mainline	23,422	23,413			23,486	23,413	23,439	23,433	73	1,495
06/01/2015 00:00:00	I5-N	2.285	2.20		5 NB @ Dairy Mart	Mainline	23,380	23,414			23,455	23,414	23,398	23,393	73	1,491
07/01/2015 00:00:00	I5-N	2.285	2.20		5 NB @ Dairy Mart	Mainline	23,354	23,359			23,424	23,359	23,344	23,340	72	1,488

Starting Month	Fwy	CA PM	Abs PM	VDS	Name	Type	Arithmetic Mean	ASTM Std 1442	Conv. AASHTO	Prov. AASHTO	Sum of 24 Annual Avg Hours	Mod. ASTM Std	Mod. Conv. AASHTO	Mod. Prov. AASHTO	% Data Used	K
05/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,512	4,525	4,525	4,529	4,528	4,525	4,525	4,529	85	649
05/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	94,786	94,867	94,867	94,947	95,034	94,867	94,867	94,947	86	6,941
05/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,513	11,516	11,516	11,483	11,494	11,516	11,516	11,483	86	1,465
05/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,926	15,963	15,963	15,971	15,974	15,963	15,963	15,971	86	1,717
06/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,882	15,935	15,935	15,943	15,941	15,935	15,935	15,943	86	1,717
06/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,582	11,595	11,595	11,558	11,560	11,595	11,595	11,558	86	1,465
06/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	94,892	94,987	94,987	95,067	95,168	94,987	94,987	95,067	86	6,924
06/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,528	4,545	4,545	4,551	4,547	4,545	4,545	4,551	86	649
07/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	95,036	95,110	95,110	95,179	95,262	95,110	95,110	95,179	87	6,908
07/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,680	11,677	11,677	11,639	11,663	11,677	11,677	11,639	87	1,486
07/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,534	4,541	4,541	4,548	4,550	4,541	4,541	4,548	86	657
07/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,842	15,872	15,872	15,877	15,901	15,872	15,872	15,877	87	1,662
08/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,785	15,825	15,825	15,833	15,855	15,825	15,825	15,833	87	1,662
08/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,521	4,524	4,524	4,538	4,543	4,524	4,524	4,538	87	662
08/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,787	11,789	11,789	11,756	11,792	11,789	11,789	11,756	87	1,487
08/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	95,047	95,164	95,164	95,278	95,302	95,164	95,164	95,278	87	6,907
09/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	On Ramp	4,521	4,514	4,514	4,532	4,535	4,514	4,514	4,532	88	656
09/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	Off Ramp	15,807	15,795	15,795	15,809	15,837	15,795	15,795	15,809	88	1,650
09/01/2015 00:00:00	I5-N	R36.232	36.12		EB VIA DE LA VALLE	Mainline	95,217	95,188	95,188	95,291	95,365	95,188	95,188	95,291	88	6,894
09/01/2015 00:00:00	I5-N	R36.232	36.12		VIA DE LA VALLE	HOV	11,911	11,889	11,889	11,878	11,911	11,889	11,889	11,878	88	1,487
05/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,664	5,662	5,662	5,662	5,669	5,662	5,662	5,662	87	519
06/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,650	5,648	5,648	5,650	5,657	5,648	5,648	5,650	87	514
07/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,634	5,630	5,630	5,632	5,639	5,630	5,630	5,632	88	510
08/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,628	5,626	5,626	5,628	5,634	5,626	5,626	5,628	87	514
09/01/2015 00:00:00	I5-N	R36.496	36.39		WB VIA DE LA VALLE	On Ramp	5,624	5,617	5,617	5,625	5,626	5,617	5,617	5,625	87	511
05/01/2015 00:00:00	I5-N	R37.37	37.26		LOMAS SANTA FE DR	On Ramp	4,705	4,729	4,729	4,740	4,745	4,729	4,729	4,740	86	614
05/01/2015 00:00:00	I5-N	R37.37	37.26		5N Lomas Santa Fe EB	Mainline	94,353	94,445	94,445	94,516	94,584	94,445	94,445	94,516	86	6,856
05/01/2015 00:00:00	I5-N	R37.37	37.26		LOMAS SANTA FE	Off Ramp	8,894	8,904	8,904	8,905	8,918	8,904	8,904	8,905	86	887

APPENDIX C

EXISTING SYNCHRO WORKSHEETS

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	161	22	148	134	205	32	163	118	412	704	63
Future Volume (vph)	37	161	22	148	134	205	32	163	118	412	704	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.99		1.00	0.94	0.85	1.00	0.94		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3458		3433	3175	1441	1770	3316		1770	3496	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3458		3433	3175	1441	1770	3316		1770	3496	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	41	179	24	164	149	228	36	181	131	458	782	70
RTOR Reduction (vph)	0	7	0	0	97	106	0	89	0	0	4	0
Lane Group Flow (vph)	0	237	0	164	161	13	36	223	0	458	848	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		14.4		13.3	13.3	13.3	4.6	38.1		38.2	71.7	
Effective Green, g (s)		14.4		13.3	13.3	13.3	4.6	38.1		38.2	71.7	
Actuated g/C Ratio		0.12		0.11	0.11	0.11	0.04	0.32		0.32	0.60	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		414		380	351	159	67	1052		563	2088	
v/s Ratio Prot		c0.07		0.05	c0.05		0.02	0.07		c0.26	c0.24	
v/s Ratio Perm						0.01						
v/c Ratio		0.57		0.43	0.46	0.08	0.54	0.21		0.81	0.41	
Uniform Delay, d1		49.9		49.8	50.0	47.9	56.7	30.0		37.6	12.8	
Progression Factor		1.00		1.00	1.00	1.00	0.97	0.84		1.00	1.00	
Incremental Delay, d2		1.9		0.8	1.0	0.2	8.0	0.5		8.8	0.6	
Delay (s)		51.8		50.6	50.9	48.1	63.2	25.7		46.4	13.4	
Level of Service		D		D	D	D	E	C		D	B	
Approach Delay (s)		51.8			50.2			29.5			25.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	495	103	66	371	57	57	15	70	59	11	63
Future Volume (veh/h)	64	495	103	66	371	57	57	15	70	59	11	63
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	71	550	114	73	412	63	63	17	78	66	12	70
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	92	728	150	95	1276	396	801	157	720	759	1007	854
Arrive On Green	0.05	0.25	0.25	0.05	0.25	0.25	0.54	0.54	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1781	2933	606	1781	5106	1585	1316	292	1338	1301	1870	1585
Grp Volume(v), veh/h	71	332	332	73	412	63	63	0	95	66	12	70
Grp Sat Flow(s),veh/h/ln	1781	1777	1761	1781	1702	1585	1316	0	1630	1301	1870	1585
Q Serve(g_s), s	3.0	13.0	13.1	3.0	4.9	2.3	1.8	0.0	2.1	2.0	0.2	1.6
Cycle Q Clear(g_c), s	3.0	13.0	13.1	3.0	4.9	2.3	2.0	0.0	2.1	4.1	0.2	1.6
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.82	1.00		1.00
Lane Grp Cap(c), veh/h	92	441	437	95	1276	396	801	0	877	759	1007	854
V/C Ratio(X)	0.77	0.75	0.76	0.77	0.32	0.16	0.08	0.00	0.11	0.09	0.01	0.08
Avail Cap(c_a), veh/h	285	687	681	285	1974	613	801	0	877	759	1007	854
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.61	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	26.1	26.1	35.1	23.0	22.0	8.5	0.0	8.5	9.5	8.0	8.4
Incr Delay (d2), s/veh	8.1	1.6	1.7	12.3	0.1	0.2	0.2	0.0	0.2	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	5.4	5.4	1.6	1.9	0.9	0.5	0.0	0.7	0.6	0.1	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.2	27.7	27.8	47.4	23.1	22.2	8.7	0.0	8.7	9.7	8.1	8.5
LnGrp LOS	D	C	C	D	C	C	A	A	A	A	A	A
Approach Vol, veh/h		735			548			158			148	
Approach Delay, s/veh		29.2			26.2			8.7			9.0	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		44.4	8.0	22.6		44.4	7.9	22.7
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		22.0	12.0	29.0		22.0	12.0	29.0
Max Q Clear Time (g_c+I1), s		4.1	5.0	15.1		6.1	5.0	6.9
Green Ext Time (p_c), s		0.6	0.1	3.6		0.4	0.1	3.0

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	3	1	28	0	36	0	99	38	19	104	0
Future Volume (vph)	1	3	1	28	0	36	0	99	38	19	104	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	3	1	31	0	40	0	110	42	21	116	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	5	71	152	137
Volume Left (vph)	1	31	0	21
Volume Right (vph)	1	40	42	0
Hadj (s)	-0.05	-0.22	-0.13	0.06
Departure Headway (s)	4.6	4.3	4.1	4.3
Degree Utilization, x	0.01	0.09	0.17	0.16
Capacity (veh/h)	723	772	854	818
Control Delay (s)	7.6	7.7	7.9	8.1
Approach Delay (s)	7.6	7.7	7.9	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	43	28	55	248	816	32
Future Volume (vph)	43	28	55	248	816	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.95		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1712		1770	3539	3519	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1712		1770	3539	3519	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	48	31	61	276	907	36
RTOR Reduction (vph)	23	0	0	0	1	0
Lane Group Flow (vph)	56	0	61	276	942	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	9.5		8.3	102.0	89.7	
Effective Green, g (s)	9.5		8.3	102.0	89.7	
Actuated g/C Ratio	0.08		0.07	0.85	0.75	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	135		122	3008	2630	
v/s Ratio Prot	c0.03		c0.03	0.08	c0.27	
v/s Ratio Perm						
v/c Ratio	0.41		0.50	0.09	0.36	
Uniform Delay, d1	52.6		53.8	1.5	5.2	
Progression Factor	1.00		0.86	0.99	0.35	
Incremental Delay, d2	2.1		3.2	0.1	0.4	
Delay (s)	54.7		49.5	1.5	2.2	
Level of Service	D		D	A	A	
Approach Delay (s)	54.7			10.2	2.2	
Approach LOS	D			B	A	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	136	32	141	98	175	18	169	141	367	444	15
Future Volume (veh/h)	4	136	32	141	98	175	18	169	141	367	444	15
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	4	151	36	157	109	194	20	188	157	408	493	17
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	33	295	69	249	381	323	29	1594	711	441	2384	82
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.02	0.45	0.45	0.33	0.90	0.90
Sat Flow, veh/h	11	1451	339	1196	1870	1585	1781	3554	1585	1781	3505	121
Grp Volume(v), veh/h	191	0	0	157	109	194	20	188	157	408	250	260
Grp Sat Flow(s),veh/h/ln	1801	0	0	1196	1870	1585	1781	1777	1585	1781	1777	1849
Q Serve(g_s), s	0.0	0.0	0.0	9.5	5.9	13.3	1.3	3.7	7.3	26.5	2.0	2.0
Cycle Q Clear(g_c), s	11.3	0.0	0.0	20.8	5.9	13.3	1.3	3.7	7.3	26.5	2.0	2.0
Prop In Lane	0.02		0.19	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	397	0	0	249	381	323	29	1594	711	441	1208	1257
V/C Ratio(X)	0.48	0.00	0.00	0.63	0.29	0.60	0.69	0.12	0.22	0.92	0.21	0.21
Avail Cap(c_a), veh/h	599	0	0	384	592	502	74	1594	711	713	1208	1257
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	42.5	0.0	0.0	48.0	40.4	43.4	58.7	19.3	20.2	39.1	1.9	1.9
Incr Delay (d2), s/veh	0.9	0.0	0.0	2.6	0.4	1.8	25.6	0.2	0.7	11.7	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	5.2	0.0	0.0	4.7	2.8	5.4	0.8	1.6	2.8	12.3	0.7	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.4	0.0	0.0	50.6	40.8	45.2	84.3	19.4	21.0	50.8	2.3	2.3
LnGrp LOS	D	A	A	D	D	D	F	B	C	D	A	A
Approach Vol, veh/h		191			460			365			918	
Approach Delay, s/veh		43.4			46.0			23.6			23.9	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	33.7	57.8		28.4	5.9	85.6		28.4
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	48.0	22.0		38.0	5.0	65.0		38.0
Max Q Clear Time (g_c+I1), s	28.5	9.3		13.3	3.3	4.0		22.8
Green Ext Time (p_c), s	1.2	1.3		1.1	0.0	3.4		1.6

Intersection Summary		
HCM 6th Ctrl Delay		31.0
HCM 6th LOS		C

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	230	20	232	204	493	44	728	158	291	401	49
Future Volume (vph)	90	230	20	232	204	493	44	728	158	291	401	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.99		1.00	0.92	0.85	1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3463		3433	3112	1441	1770	3444		1770	3482	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3463		3433	3112	1441	1770	3444		1770	3482	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	256	22	258	227	548	49	809	176	323	446	54
RTOR Reduction (vph)	0	4	0	0	188	230	0	14	0	0	7	0
Lane Group Flow (vph)	0	374	0	258	313	44	49	971	0	323	493	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		18.0		19.3	19.3	19.3	6.4	41.8		24.9	60.3	
Effective Green, g (s)		18.0		19.3	19.3	19.3	6.4	41.8		24.9	60.3	
Actuated g/C Ratio		0.15		0.16	0.16	0.16	0.05	0.35		0.21	0.50	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		519		552	500	231	94	1199		367	1749	
v/s Ratio Prot		c0.11		0.08	c0.10		0.03	c0.28		c0.18	0.14	
v/s Ratio Perm						0.03						
v/c Ratio		0.72		0.47	0.63	0.19	0.52	0.81		0.88	0.28	
Uniform Delay, d1		48.6		45.7	47.0	43.6	55.3	35.5		46.1	17.3	
Progression Factor		1.00		1.00	1.00	1.00	0.99	0.77		1.00	1.00	
Incremental Delay, d2		4.9		0.6	2.4	0.4	5.0	5.8		21.0	0.4	
Delay (s)		53.5		46.3	49.4	44.0	59.7	33.1		67.1	17.7	
Level of Service		D		D	D	D	E	C		E	B	
Approach Delay (s)		53.5			47.2			34.4			37.1	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	483	60	101	676	41	98	38	127	94	27	133
Future Volume (veh/h)	77	483	60	101	676	41	98	38	127	94	27	133
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	86	537	67	112	751	46	109	42	141	104	30	148
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	713	89	144	1239	385	732	202	677	668	1000	848
Arrive On Green	0.06	0.22	0.22	0.08	0.24	0.24	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	1781	3180	396	1781	5106	1585	1206	377	1266	1201	1870	1585
Grp Volume(v), veh/h	86	299	305	112	751	46	109	0	183	104	30	148
Grp Sat Flow(s),veh/h/ln	1781	1777	1799	1781	1702	1585	1206	0	1643	1201	1870	1585
Q Serve(g_s), s	3.6	11.8	11.9	4.6	9.8	1.7	3.5	0.0	4.4	3.7	0.6	3.6
Cycle Q Clear(g_c), s	3.6	11.8	11.9	4.6	9.8	1.7	4.1	0.0	4.4	8.1	0.6	3.6
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.77	1.00		1.00
Lane Grp Cap(c), veh/h	112	398	403	144	1239	385	732	0	878	668	1000	848
V/C Ratio(X)	0.77	0.75	0.76	0.78	0.61	0.12	0.15	0.00	0.21	0.16	0.03	0.17
Avail Cap(c_a), veh/h	261	616	624	285	1838	571	732	0	878	668	1000	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.51	0.51	0.51	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.6	27.1	27.2	33.8	25.2	22.2	9.2	0.0	9.1	11.3	8.3	9.0
Incr Delay (d2), s/veh	5.7	1.5	1.5	8.6	0.5	0.1	0.4	0.0	0.5	0.5	0.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	4.9	5.0	2.3	3.8	0.6	0.9	0.0	1.5	1.0	0.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	28.6	28.7	42.4	25.7	22.3	9.6	0.0	9.7	11.8	8.3	9.4
LnGrp LOS	D	C	C	D	C	C	A	A	A	B	A	A
Approach Vol, veh/h		690			909			292			282	
Approach Delay, s/veh		30.1			27.6			9.7			10.2	
Approach LOS		C			C			A			B	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		44.1	10.1	20.8		44.1	8.7	22.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		25.0	12.0	26.0		25.0	11.0	27.0
Max Q Clear Time (g_c+I1), s		6.4	6.6	13.9		10.1	5.6	11.8
Green Ext Time (p_c), s		1.4	0.1	3.0		0.9	0.1	4.8

Intersection Summary			
HCM 6th Ctrl Delay			23.7
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	1	1	26	1	53	2	134	48	38	92	3
Future Volume (vph)	1	1	1	26	1	53	2	134	48	38	92	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	1	1	29	1	59	2	149	53	42	102	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	3	89	204	147
Volume Left (vph)	1	29	2	42
Volume Right (vph)	1	59	53	3
Hadj (s)	-0.10	-0.30	-0.12	0.08
Departure Headway (s)	4.7	4.4	4.2	4.4
Degree Utilization, x	0.00	0.11	0.24	0.18
Capacity (veh/h)	696	756	839	785
Control Delay (s)	7.7	7.9	8.4	8.4
Approach Delay (s)	7.7	7.9	8.4	8.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.3		
Level of Service	A		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	69	42	48	850	679	53
Future Volume (vph)	69	42	48	850	679	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.95		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1714		1770	3539	3501	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1714		1770	3539	3501	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	77	47	53	944	754	59
RTOR Reduction (vph)	21	0	0	0	3	0
Lane Group Flow (vph)	103	0	53	944	810	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	12.9		7.9	98.6	86.7	
Effective Green, g (s)	12.9		7.9	98.6	86.7	
Actuated g/C Ratio	0.11		0.07	0.82	0.72	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	184		116	2907	2529	
v/s Ratio Prot	c0.06		c0.03	c0.27	0.23	
v/s Ratio Perm						
v/c Ratio	0.56		0.46	0.32	0.32	
Uniform Delay, d1	50.8		54.0	2.6	6.0	
Progression Factor	1.00		0.77	2.16	0.50	
Incremental Delay, d2	3.6		2.5	0.3	0.3	
Delay (s)	54.5		44.2	5.9	3.3	
Level of Service	D		D	A	A	
Approach Delay (s)	54.5			7.9	3.3	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	119	61	230	153	504	34	537	130	251	305	30
Future Volume (veh/h)	10	119	61	230	153	504	34	537	130	251	305	30
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	11	132	68	256	170	560	38	597	144	279	339	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	419	206	460	698	592	49	1264	564	305	1635	158
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.03	0.36	0.36	0.34	1.00	1.00
Sat Flow, veh/h	37	1124	552	1182	1870	1585	1781	3554	1585	1781	3274	317
Grp Volume(v), veh/h	211	0	0	256	170	560	38	597	144	279	183	189
Grp Sat Flow(s),veh/h/ln	1713	0	0	1182	1870	1585	1781	1777	1585	1781	1777	1813
Q Serve(g_s), s	0.0	0.0	0.0	16.0	7.5	41.1	2.5	15.6	7.7	18.0	0.0	0.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0	26.2	7.5	41.1	2.5	15.6	7.7	18.0	0.0	0.0
Prop In Lane	0.05		0.32	1.00		1.00	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	671	0	0	460	698	592	49	1264	564	305	888	906
V/C Ratio(X)	0.31	0.00	0.00	0.56	0.24	0.95	0.78	0.47	0.26	0.91	0.21	0.21
Avail Cap(c_a), veh/h	701	0	0	482	733	621	89	1264	564	430	888	906
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	26.8	0.0	0.0	33.1	25.9	36.5	58.0	30.0	27.4	38.6	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	1.3	0.2	23.2	23.4	1.3	1.1	18.4	0.5	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	4.4	0.0	0.0	6.4	3.4	19.4	1.5	6.9	3.1	8.1	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.0	0.0	0.0	34.4	26.1	59.7	81.4	31.2	28.5	57.0	0.5	0.5
LnGrp LOS	C	A	A	C	C	E	F	C	C	E	A	A
Approach Vol, veh/h		211			986			779			651	
Approach Delay, s/veh		27.0			47.3			33.2			24.7	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	24.6	46.7		48.8	7.3	63.9		48.8
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	29.0	32.0		47.0	6.0	55.0		47.0
Max Q Clear Time (g_c+I1), s	20.0	17.6		12.2	4.5	2.0		43.1
Green Ext Time (p_c), s	0.6	3.9		1.4	0.0	2.4		1.7

Intersection Summary		
HCM 6th Ctrl Delay		35.9
HCM 6th LOS		D

APPENDIX D

EXISTING WITH PROJECT SYNCHRO WORKSHEETS

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	163	22	172	134	205	32	165	122	412	718	63
Future Volume (vph)	38	163	22	172	134	205	32	165	122	412	718	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.99		1.00	0.94	0.85	1.00	0.94		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3458		3433	3175	1441	1770	3313		1770	3496	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3458		3433	3175	1441	1770	3313		1770	3496	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	42	181	24	191	149	228	36	183	136	458	798	70
RTOR Reduction (vph)	0	7	0	0	95	104	0	94	0	0	4	0
Lane Group Flow (vph)	0	240	0	191	163	15	36	225	0	458	864	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		14.5		15.2	15.2	15.2	4.6	37.0		37.3	69.7	
Effective Green, g (s)		14.5		15.2	15.2	15.2	4.6	37.0		37.3	69.7	
Actuated g/C Ratio		0.12		0.13	0.13	0.13	0.04	0.31		0.31	0.58	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		417		434	402	182	67	1021		550	2030	
v/s Ratio Prot		c0.07		c0.06	0.05		0.02	0.07		c0.26	c0.25	
v/s Ratio Perm						0.01						
v/c Ratio		0.58		0.44	0.40	0.08	0.54	0.22		0.83	0.43	
Uniform Delay, d1		49.8		48.5	48.2	46.2	56.7	30.8		38.4	14.0	
Progression Factor		1.00		1.00	1.00	1.00	1.28	0.67		1.00	1.00	
Incremental Delay, d2		1.9		0.7	0.7	0.2	8.0	0.5		10.4	0.7	
Delay (s)		51.8		49.2	48.9	46.4	80.7	21.2		48.9	14.7	
Level of Service		D		D	D	D	F	C		D	B	
Approach Delay (s)		51.8			48.5			27.3			26.5	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	500	103	66	389	57	59	15	70	59	11	66
Future Volume (veh/h)	64	500	103	66	389	57	59	15	70	59	11	66
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	71	556	114	73	432	63	66	17	78	66	12	73
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	91	726	148	94	1269	394	801	158	723	762	1010	856
Arrive On Green	0.05	0.25	0.25	0.05	0.25	0.25	0.54	0.54	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1781	2939	600	1781	5106	1585	1313	292	1338	1301	1870	1585
Grp Volume(v), veh/h	71	335	335	73	432	63	66	0	95	66	12	73
Grp Sat Flow(s),veh/h/ln	1781	1777	1762	1781	1702	1585	1313	0	1630	1301	1870	1585
Q Serve(g_s), s	3.0	13.1	13.2	3.0	5.2	2.3	1.8	0.0	2.1	2.0	0.2	1.7
Cycle Q Clear(g_c), s	3.0	13.1	13.2	3.0	5.2	2.3	2.1	0.0	2.1	4.1	0.2	1.7
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.82	1.00		1.00
Lane Grp Cap(c), veh/h	91	439	435	94	1269	394	801	0	880	762	1010	856
V/C Ratio(X)	0.78	0.76	0.77	0.78	0.34	0.16	0.08	0.00	0.11	0.09	0.01	0.09
Avail Cap(c_a), veh/h	166	640	634	190	1906	592	801	0	880	762	1010	856
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.59	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	26.2	26.2	35.1	23.1	22.0	8.5	0.0	8.4	9.4	8.0	8.3
Incr Delay (d2), s/veh	8.1	2.0	2.1	12.7	0.2	0.2	0.2	0.0	0.2	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	5.5	5.5	1.6	2.0	0.9	0.5	0.0	0.7	0.6	0.1	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.3	28.2	28.3	47.8	23.3	22.2	8.7	0.0	8.7	9.6	8.0	8.5
LnGrp LOS	D	C	C	D	C	C	A	A	A	A	A	A
Approach Vol, veh/h		741			568			161			151	
Approach Delay, s/veh		29.7			26.3			8.7			9.0	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		44.5	8.0	22.5		44.5	7.8	22.6
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		28.0	8.0	27.0		28.0	7.0	28.0
Max Q Clear Time (g_c+I1), s		4.1	5.0	15.2		6.1	5.0	7.2
Green Ext Time (p_c), s		0.7	0.0	3.3		0.4	0.0	3.1

Intersection Summary	
HCM 6th Ctrl Delay	24.5
HCM 6th LOS	C

HCM Unsignalized Intersection Capacity Analysis
3: S. Sierra Ave. & Dahlia Dr.

Existing + Project AM
06/09/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	10	1	28	1	38	0	99	38	28	105	0
Future Volume (vph)	1	10	1	28	1	38	0	99	38	28	105	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	11	1	31	1	42	0	110	42	31	117	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	13	74	152	148
Volume Left (vph)	1	31	0	31
Volume Right (vph)	1	42	42	0
Hadj (s)	0.00	-0.22	-0.13	0.08
Departure Headway (s)	4.7	4.4	4.1	4.3
Degree Utilization, x	0.02	0.09	0.17	0.18
Capacity (veh/h)	709	764	844	809
Control Delay (s)	7.7	7.8	8.0	8.3
Approach Delay (s)	7.7	7.8	8.0	8.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	43	115	248	816	71
Future Volume (vph)	50	43	115	248	816	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.94		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1701		1770	3539	3497	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1701		1770	3539	3497	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	48	128	276	907	79
RTOR Reduction (vph)	30	0	0	0	4	0
Lane Group Flow (vph)	74	0	128	276	982	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	11.4		14.1	100.1	82.0	
Effective Green, g (s)	11.4		14.1	100.1	82.0	
Actuated g/C Ratio	0.10		0.12	0.83	0.68	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	161		207	2952	2389	
v/s Ratio Prot	c0.04		c0.07	0.08	c0.28	
v/s Ratio Perm						
v/c Ratio	0.46		0.62	0.09	0.41	
Uniform Delay, d1	51.4		50.4	1.8	8.4	
Progression Factor	1.00		0.86	0.93	0.50	
Incremental Delay, d2	2.1		5.3	0.1	0.5	
Delay (s)	53.5		48.8	1.7	4.7	
Level of Service	D		D	A	A	
Approach Delay (s)	53.5			16.6	4.7	
Approach LOS	D			B	A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	136	32	141	98	218	18	181	141	377	447	15
Future Volume (veh/h)	4	136	32	141	98	218	18	181	141	377	447	15
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	4	151	36	157	109	242	20	201	157	419	497	17
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	33	295	69	248	380	322	29	1592	710	443	2385	81
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.02	0.45	0.45	0.50	1.00	1.00
Sat Flow, veh/h	11	1450	339	1196	1870	1585	1781	3554	1585	1781	3506	120
Grp Volume(v), veh/h	191	0	0	157	109	242	20	201	157	419	252	262
Grp Sat Flow(s),veh/h/ln	1800	0	0	1196	1870	1585	1781	1777	1585	1781	1777	1849
Q Serve(g_s), s	0.0	0.0	0.0	9.5	5.9	17.2	1.3	4.0	7.3	26.8	0.0	0.0
Cycle Q Clear(g_c), s	11.3	0.0	0.0	20.8	5.9	17.2	1.3	4.0	7.3	26.8	0.0	0.0
Prop In Lane	0.02		0.19	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	397	0	0	248	380	322	29	1592	710	443	1209	1258
V/C Ratio(X)	0.48	0.00	0.00	0.63	0.29	0.75	0.69	0.13	0.22	0.95	0.21	0.21
Avail Cap(c_a), veh/h	539	0	0	344	530	449	134	1592	710	594	1209	1258
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	42.6	0.0	0.0	48.0	40.4	44.9	58.7	19.4	20.3	29.4	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.0	2.7	0.4	4.5	25.6	0.2	0.7	19.5	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	0.0	4.7	2.8	7.2	0.8	1.7	2.8	11.1	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.5	0.0	0.0	50.7	40.8	49.4	84.3	19.5	21.0	48.9	0.4	0.3
LnGrp LOS	D	A	A	D	D	D	F	B	C	D	A	A
Approach Vol, veh/h		191			508			378			933	
Approach Delay, s/veh		43.5			48.0			23.6			22.2	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	33.8	57.7		28.4	5.9	85.6		28.4
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	40.0	34.0		34.0	9.0	65.0		34.0
Max Q Clear Time (g_c+I1), s	28.8	9.3		13.3	3.3	2.0		22.8
Green Ext Time (p_c), s	1.1	1.8		1.0	0.0	3.5		1.6

Intersection Summary		
HCM 6th Ctrl Delay		31.0
HCM 6th LOS		C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	4	137	1	1	127
Future Volume (Veh/h)	6	4	137	1	1	127
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	4	149	1	1	138
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	290	150			150	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290	150			150	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	701	897			1431	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	11	150	139
Volume Left	7	0	1
Volume Right	4	1	0
cSH	761	1700	1431
Volume to Capacity	0.01	0.09	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.8	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	65	78	101	18	2
Future Volume (Veh/h)	11	65	78	101	18	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	71	85	110	20	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			208			
pX, platoon unblocked						
vC, conflicting volume	195				235	140
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	195				235	140
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	100
cM capacity (veh/h)	1378				747	908

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	83	195	22
Volume Left	12	0	20
Volume Right	0	110	2
cSH	1378	1700	759
Volume to Capacity	0.01	0.11	0.03
Queue Length 95th (ft)	1	0	2
Control Delay (s)	1.2	0.0	9.9
Lane LOS	A		A
Approach Delay (s)	1.2	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Driveway A			

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	230	20	248	205	493	44	742	181	291	411	49
Future Volume (vph)	90	230	20	248	205	493	44	742	181	291	411	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.99		1.00	0.92	0.85	1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3463		3433	3113	1441	1770	3435		1770	3483	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3463		3433	3113	1441	1770	3435		1770	3483	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	256	22	276	228	548	49	824	201	323	457	54
RTOR Reduction (vph)	0	4	0	0	185	227	0	16	0	0	6	0
Lane Group Flow (vph)	0	374	0	276	317	47	49	1009	0	323	505	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		18.4		20.7	20.7	20.7	6.6	38.6		26.3	58.3	
Effective Green, g (s)		18.4		20.7	20.7	20.7	6.6	38.6		26.3	58.3	
Actuated g/C Ratio		0.15		0.17	0.17	0.17	0.05	0.32		0.22	0.49	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		530		592	536	248	97	1104		387	1692	
v/s Ratio Prot		c0.11		0.08	c0.10		0.03	c0.29		c0.18	0.14	
v/s Ratio Perm						0.03						
v/c Ratio		0.71		0.47	0.59	0.19	0.51	0.91		0.83	0.30	
Uniform Delay, d1		48.2		44.7	45.7	42.5	55.1	39.1		44.8	18.6	
Progression Factor		1.00		1.00	1.00	1.00	1.34	0.66		1.00	1.00	
Incremental Delay, d2		4.3		0.6	1.7	0.4	3.9	12.5		14.3	0.5	
Delay (s)		52.5		45.3	47.5	42.9	77.9	38.2		59.1	19.0	
Level of Service		D		D	D	D	E	D		E	B	
Approach Delay (s)		52.5			45.7			40.0			34.5	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	501	62	101	690	41	99	38	127	94	27	135
Future Volume (veh/h)	80	501	62	101	690	41	99	38	127	94	27	135
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	89	557	69	112	767	46	110	42	141	104	30	150
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	734	91	144	1261	391	723	199	669	659	988	837
Arrive On Green	0.06	0.23	0.23	0.08	0.25	0.25	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	1781	3183	393	1781	5106	1585	1204	377	1266	1201	1870	1585
Grp Volume(v), veh/h	89	310	316	112	767	46	110	0	183	104	30	150
Grp Sat Flow(s),veh/h/ln	1781	1777	1800	1781	1702	1585	1204	0	1643	1201	1870	1585
Q Serve(g_s), s	3.7	12.2	12.3	4.6	10.0	1.7	3.6	0.0	4.4	3.8	0.6	3.7
Cycle Q Clear(g_c), s	3.7	12.2	12.3	4.6	10.0	1.7	4.2	0.0	4.4	8.2	0.6	3.7
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.77	1.00		1.00
Lane Grp Cap(c), veh/h	115	410	415	144	1261	391	723	0	868	659	988	837
V/C Ratio(X)	0.77	0.76	0.76	0.78	0.61	0.12	0.15	0.00	0.21	0.16	0.03	0.18
Avail Cap(c_a), veh/h	261	616	624	285	1838	571	723	0	868	659	988	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.56	0.56	0.56	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.5	26.9	26.9	33.8	25.0	21.9	9.5	0.0	9.4	11.6	8.5	9.2
Incr Delay (d2), s/veh	6.0	1.7	1.7	8.6	0.5	0.1	0.4	0.0	0.6	0.5	0.1	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	1.7	5.1	5.2	2.3	3.9	0.6	0.9	0.0	1.6	1.0	0.2	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.5	28.6	28.6	42.4	25.5	22.0	9.9	0.0	9.9	12.1	8.5	9.7
LnGrp LOS	D	C	C	D	C	C	A	A	A	B	A	A
Approach Vol, veh/h		715			925			293			284	
Approach Delay, s/veh		30.1			27.4			9.9			10.4	
Approach LOS		C			C			A			B	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		43.6	10.1	21.3		43.6	8.9	22.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		25.0	12.0	26.0		25.0	11.0	27.0
Max Q Clear Time (g_c+I1), s		6.4	6.6	14.3		10.2	5.7	12.0
Green Ext Time (p_c), s		1.4	0.1	3.0		0.9	0.1	4.8

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	7	1	26	8	60	2	134	48	42	92	3
Future Volume (vph)	1	7	1	26	8	60	2	134	48	42	92	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	8	1	29	9	67	2	149	53	47	102	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	10	105	204	152
Volume Left (vph)	1	29	2	47
Volume Right (vph)	1	67	53	3
Hadj (s)	-0.01	-0.29	-0.12	0.08
Departure Headway (s)	4.8	4.4	4.2	4.5
Degree Utilization, x	0.01	0.13	0.24	0.19
Capacity (veh/h)	676	750	822	770
Control Delay (s)	7.9	8.1	8.5	8.5
Approach Delay (s)	7.9	8.1	8.5	8.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.4		
Level of Service	A		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	110	105	100	850	679	86
Future Volume (vph)	110	105	100	850	679	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.93		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1696		1770	3539	3479	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1696		1770	3539	3479	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	122	117	111	944	754	96
RTOR Reduction (vph)	42	0	0	0	4	0
Lane Group Flow (vph)	197	0	111	944	846	0
Confl. Peds. (#/hr)	137					
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	19.5		12.8	92.0	75.2	
Effective Green, g (s)	19.5		12.8	92.0	75.2	
Actuated g/C Ratio	0.16		0.11	0.77	0.63	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	275		188	2713	2180	
v/s Ratio Prot	c0.12		c0.06	0.27	c0.24	
v/s Ratio Perm						
v/c Ratio	0.72		0.59	0.35	0.39	
Uniform Delay, d1	47.6		51.1	4.5	11.0	
Progression Factor	1.00		0.74	1.82	0.63	
Incremental Delay, d2	8.6		4.1	0.3	0.5	
Delay (s)	56.2		42.1	8.4	7.4	
Level of Service	E		D	A	A	
Approach Delay (s)	56.2			12.0	7.4	
Approach LOS	E			B	A	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	119	61	230	153	534	34	545	130	292	317	30
Future Volume (veh/h)	10	119	61	230	153	534	34	545	130	292	317	30
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	11	132	68	256	170	593	38	606	144	324	352	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	375	184	406	623	528	49	1311	585	352	1772	165
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.03	0.37	0.37	0.33	0.90	0.90
Sat Flow, veh/h	36	1125	552	1182	1870	1585	1781	3554	1585	1781	3286	306
Grp Volume(v), veh/h	211	0	0	256	170	593	38	606	144	324	189	196
Grp Sat Flow(s),veh/h/ln	1712	0	0	1182	1870	1585	1781	1777	1585	1781	1777	1815
Q Serve(g_s), s	0.0	0.0	0.0	17.4	8.0	40.0	2.5	15.6	7.6	21.0	1.5	1.6
Cycle Q Clear(g_c), s	10.8	0.0	0.0	28.3	8.0	40.0	2.5	15.6	7.6	21.0	1.5	1.6
Prop In Lane	0.05		0.32	1.00		1.00	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	602	0	0	406	623	528	49	1311	585	352	958	979
V/C Ratio(X)	0.35	0.00	0.00	0.63	0.27	1.12	0.78	0.46	0.25	0.92	0.20	0.20
Avail Cap(c_a), veh/h	602	0	0	406	623	528	104	1311	585	490	958	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	30.3	0.0	0.0	37.7	29.3	40.0	58.0	28.8	26.3	39.3	2.8	2.8
Incr Delay (d2), s/veh	0.3	0.0	0.0	3.1	0.2	77.3	23.3	1.2	1.0	17.3	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	4.7	0.0	0.0	7.1	3.7	26.7	1.5	6.8	3.0	9.8	0.6	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.6	0.0	0.0	40.8	29.6	117.3	81.3	30.0	27.3	56.6	3.2	3.2
LnGrp LOS	C	A	A	D	C	F	F	C	C	E	A	A
Approach Vol, veh/h		211			1019			788			709	
Approach Delay, s/veh		30.6			83.5			32.0			27.6	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.7	48.3		44.0	7.3	68.7		44.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	33.0	35.0		40.0	7.0	61.0		40.0
Max Q Clear Time (g_c+I1), s	23.0	17.6		12.8	4.5	3.6		42.0
Green Ext Time (p_c), s	0.7	4.4		1.3	0.0	2.5		0.0

Intersection Summary	
HCM 6th Ctrl Delay	50.0
HCM 6th LOS	D

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	0	193	2	2	137
Future Volume (Veh/h)	1	0	193	2	2	137
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	210	2	2	149
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	364	211			212	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	364	211			212	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	634	829			1358	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	212	151
Volume Left	1	0	2
Volume Right	0	2	0
cSH	634	1700	1358
Volume to Capacity	0.00	0.12	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	10.7	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	87	103	85	107	12
Future Volume (Veh/h)	9	87	103	85	107	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	95	112	92	116	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			208			
pX, platoon unblocked						
vC, conflicting volume	204				273	158
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204				273	158
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				84	99
cM capacity (veh/h)	1368				711	887

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	105	204	129
Volume Left	10	0	116
Volume Right	0	92	13
cSH	1368	1700	726
Volume to Capacity	0.01	0.12	0.18
Queue Length 95th (ft)	1	0	16
Control Delay (s)	0.8	0.0	11.0
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	11.0
Approach LOS			B

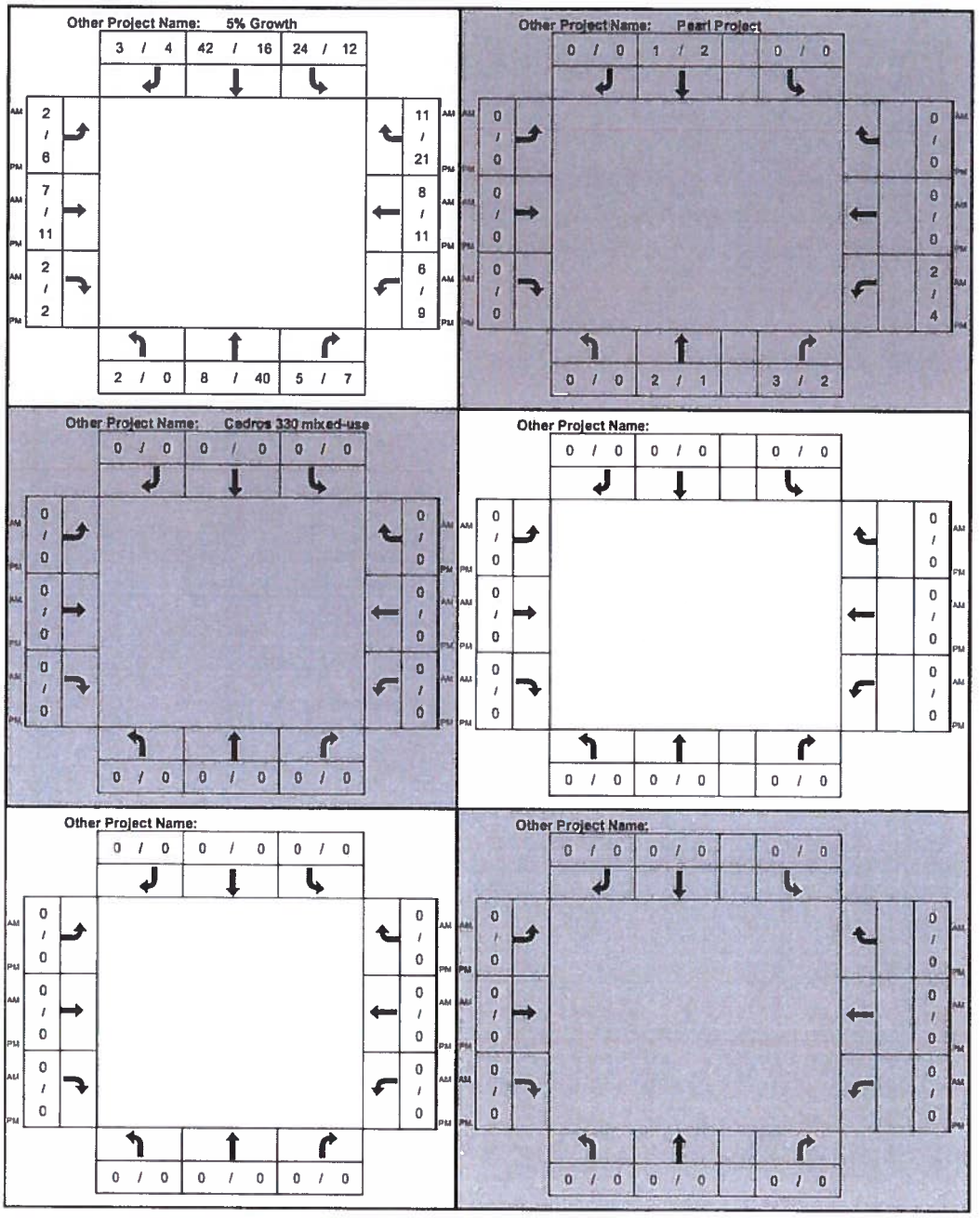
Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX E

CUMULATIVE PROJECTS INFORMATION

Other Projects

Analyst:	Henryk Pedersen	Intersection 1	
Intersection:	Highway 101 / Lomas Santa Fe Dr.	E/W Street Name:	Lomas Santa Fe Drive
Future Condition:	Other Projects	N/S Street Name:	Highway 101
Date:	12/10/2014		
Company:	Urban Systems Associates, Inc.		
Project Number:	004113		



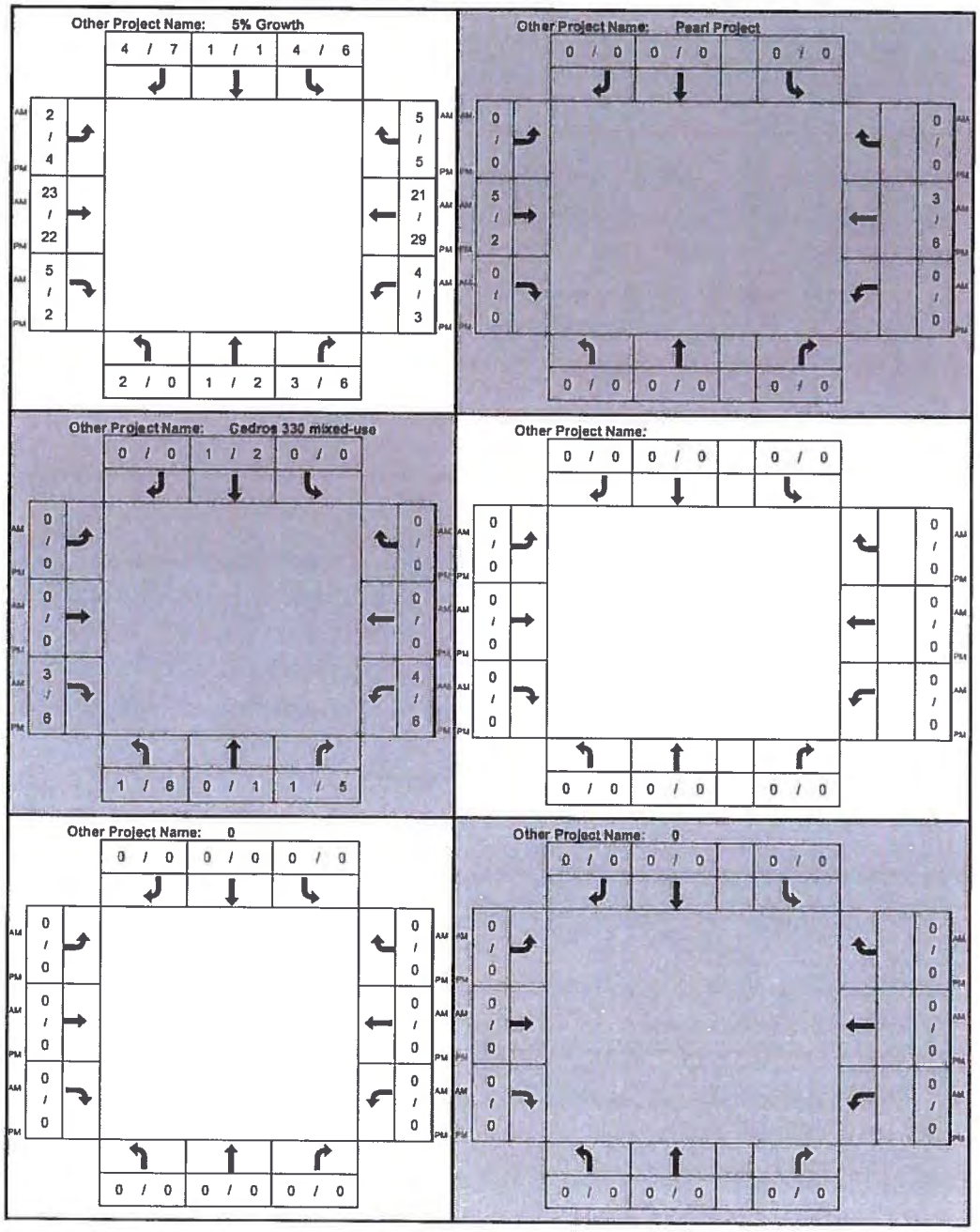
Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	2	0
NTH	10	41
NRT	8	9
SLT	24	12
STH	43	18
SRT	3	4
ELT	2	6
ETH	7	11
ERT	2	2
WLT	8	13
WTH	8	11
WRT	11	21

5% Growth

AM Existing	5%	PM Existing	5%
32	1.6	37	1.8
157	7.9	803	40
96	4.8	136	6.8
472	24	233	12
840	42	321	16
58	2.9	77	3.9
48	2.4	122	6.1
140	7	229	11
43	2.2	34	1.7
120	6	173	8.6
169	8.4	226	11
213	11	426	21

Other Projects

Analyst:	Henryk Pedersen	**Intersection 2**	
Intersection:	Cedros Ave. / Lomas Santa Fe Dr.	E/W Street Name:	Lomas Santa Fe Dr.
Future Condition:	Other Projects	N/S Street Name:	Cedros Ave.
Date:	12/10/2014		
Company:	Urban Systems Associates, Inc.		
Project Number:	004113		

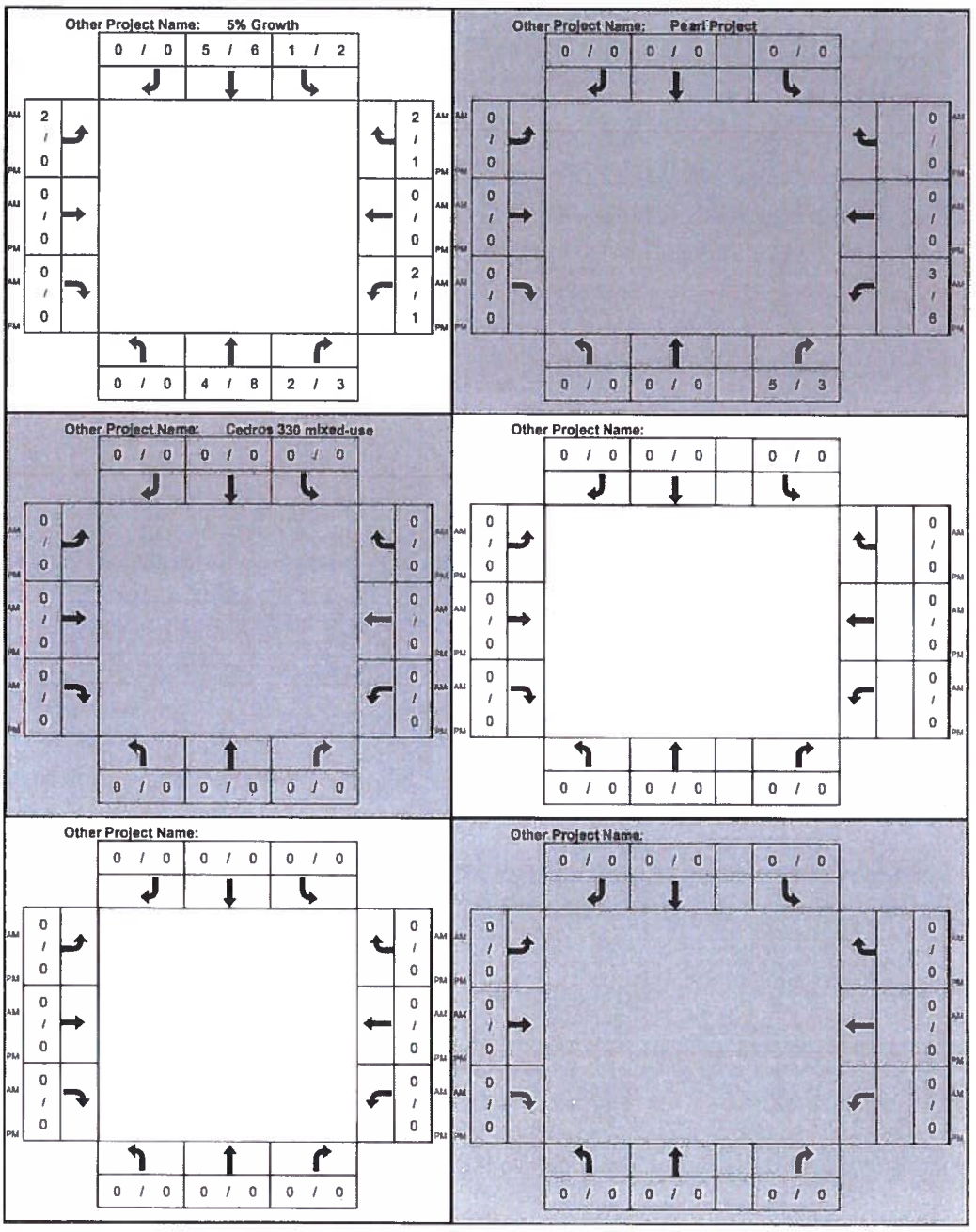


Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	3	6
NTH	1	3
NRT	4	11
SLT	4	6
STH	2	3
SRT	4	7
ELT	2	4
ETH	28	24
ERT	8	8
WLT	8	9
WTH	24	35
WRT	5	5

5% Growth			
AM		PM	
Existing	5%	Existing	5%
39	2	122	6.1
22	1.1	42	2.1
66	3.3	116	5.8
75	3.8	117	5.8
25	1.2	18	0.9
85	4.2	149	7.4
48	2.4	89	4.4
462	23	446	22
103	5.2	41	2
71	3.6	57	2.8
425	21	586	29
103	5.2	96	4.8

Other Projects

Analyst:	Henryk Pedersen	Intersection 3	
Intersection:	Sierra Ave. / Dahlia Dr.	E/W Street Name:	Dahlia Drive
Future Condition:	Other Projects	N/S Street Name:	Sierra Ave.
Date:	12/10/2014		
Company:	Urban Systems Associates, Inc.		
Project Number:	004113		



Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	4	8
NRT	7	6
SLT	1	2
STH	5	6
SRT	0	0
ELT	2	0
ETH	0	0
ERT	0	0
WLT	5	7
WTH	0	0
WRT	2	1

5% Growth

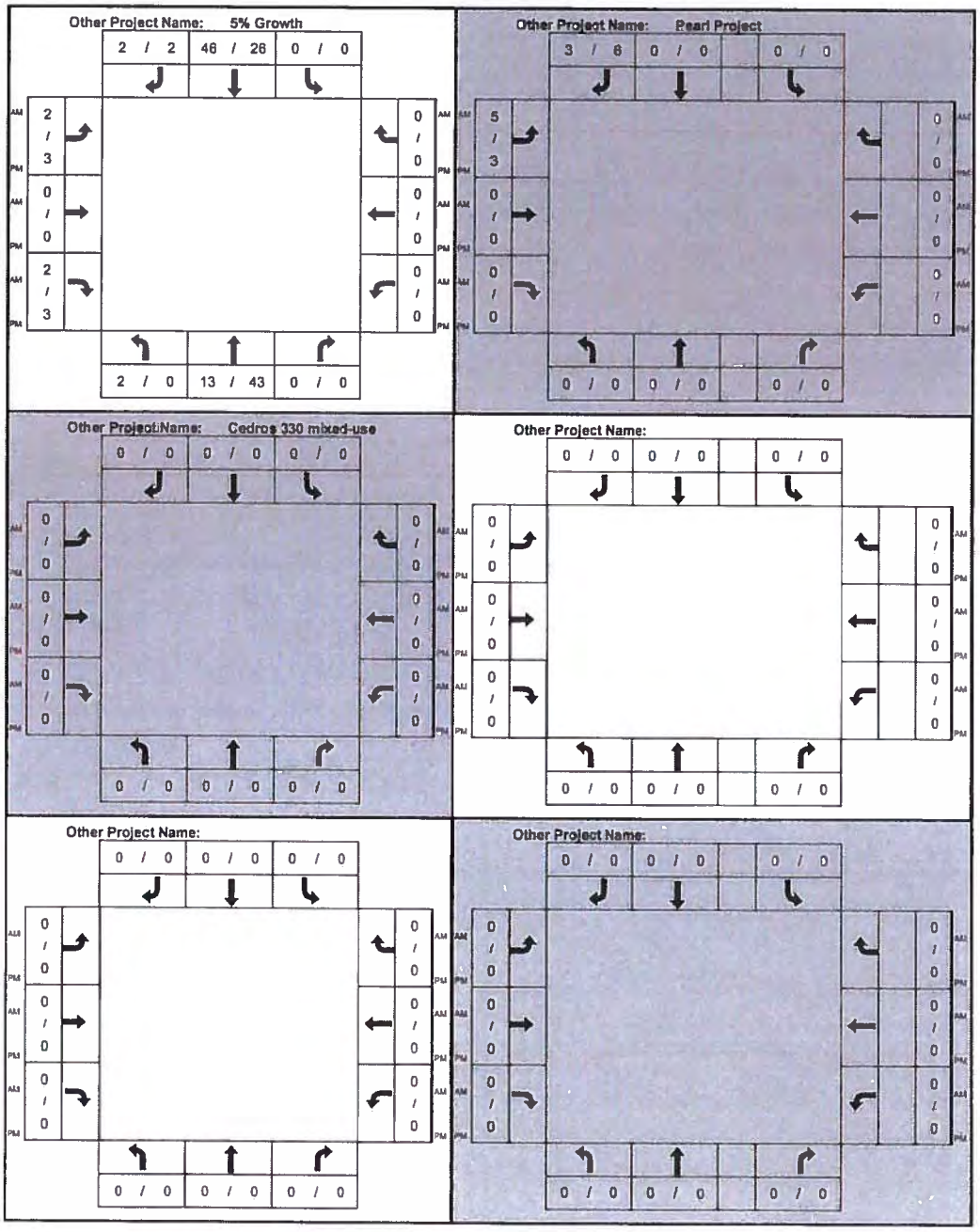
AM Existing	AM 5%	PM Existing	PM 5%
0	0	1.2	0.1
89	4.4	166	8.3
31	1.5	60	3
25	1.2	48	2.4
109	5.5	121	6
1.2	0.1	3.7	0.2
48	2.4	0	0
4.9	0.2	1.2	0.1
1.2	0.1	0	0
32	1.6	30	1.5
0	0	2.5	0.1
32	1.6	25	1.2

Other Projects

Analyst:	Henryk Pedersen
Intersection:	Highway 101 / Dahlia Dr.
Future Condition:	Other Projects
Date:	12/10/2014
Company:	Urban Systems Associates, Inc.
Project Number:	004113

Intersection 4

E/W Street Name:	Dahlia Drive
N/S Street Name:	Highway 101



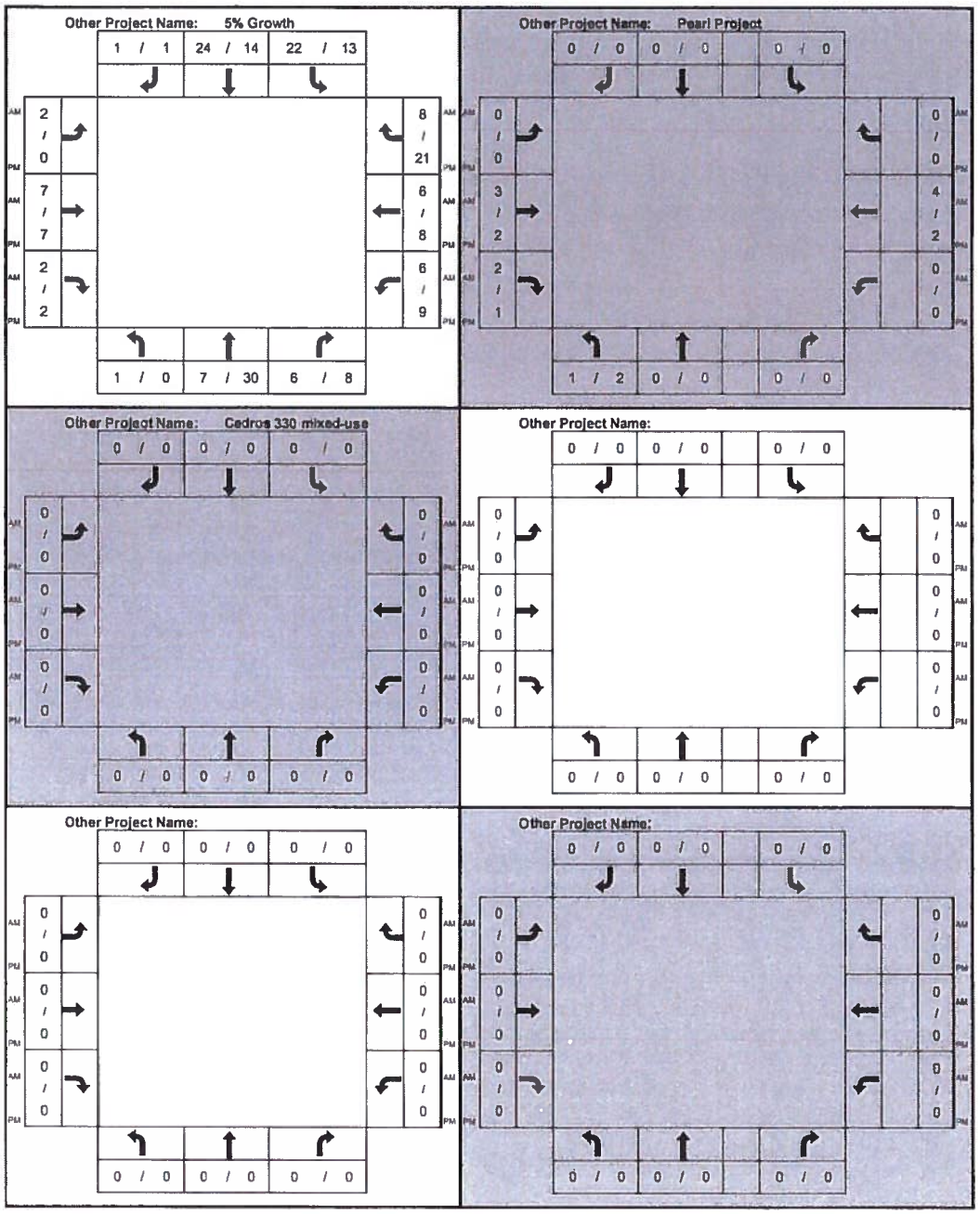
Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	2	0
NTH	13	43
NRT	0	0
SLT	0	0
STH	46	26
SRT	5	8
ELT	7	6
ETH	0	0
ERT	2	3
WLT	0	0
WTH	0	0
WRT	0	0

5% Growth

AM Existing	AM 5%	PM Existing	PM 5%
36	1.8	41	2
260	13	868	43
0	0	0	0
0	0	0	0
922	46	516	26
44	2.2	38	1.9
46	2.4	68	3.4
0	0	0	0
36	1.8	50	2.5
0	0	0	0
0	0	0	0
0	0	0	0

Other Projects

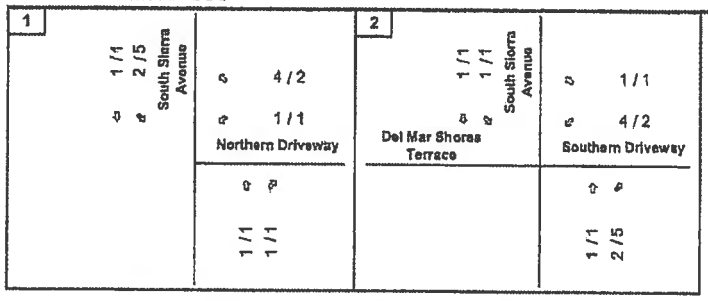
Analyst:	Henryk Pedersen	**Intersection 5**	
Intersection:	Highway 101 / Via de la Valle	E/W Street Name:	Via De La Valle
Future Condition:	Other Projects	N/S Street Name:	Highway 101
Date:	12/10/2014		
Company:	Urban Systems Associates, Inc.		
Project Number:	004113		

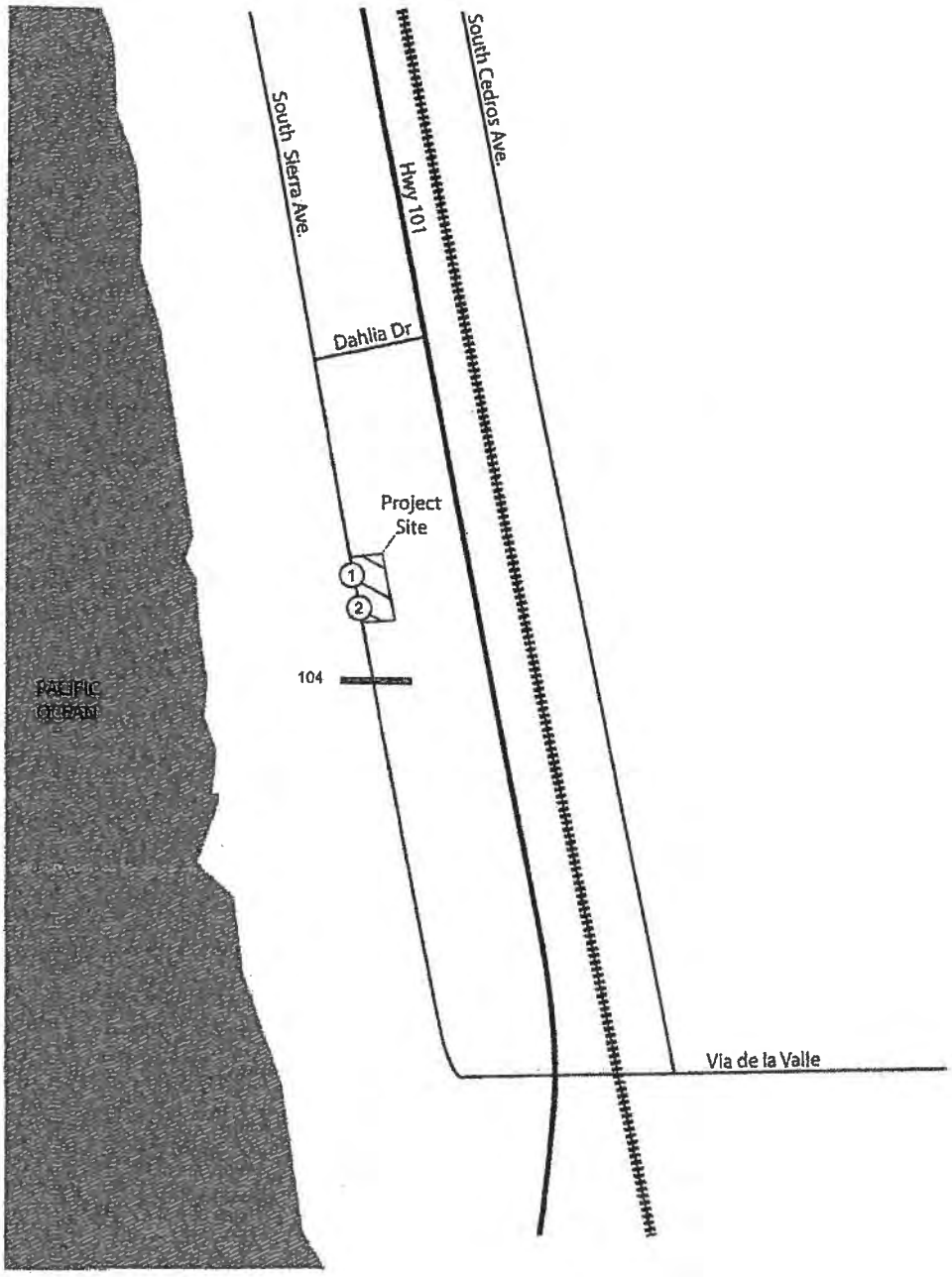


Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	2	2
NTH	7	30
NRT	6	8
SLT	22	13
STH	24	14
SRT	1	1
ELT	2	0
ETH	10	9
ERT	4	3
WLT	6	9
WTH	10	10
WRT	8	21

5% Growth			
AM Existing	5%	PM Existing	5%
22	1.1	38	1.9
145	7.2	592	30
127	6.3	154	7.7
445	22	265	13
488	24	282	14
11	0.6	22	1.1
48	2.4	1.2	0.1
138	6.9	137	6.8
32	1.6	32	1.6
112	5.6	177	8.8
112	5.6	159	7.9
154	7.7	415	21

The Peal Mixed Use





Legend

X / Y = AM / PM PEAK HOUR TURNING VOLUMES

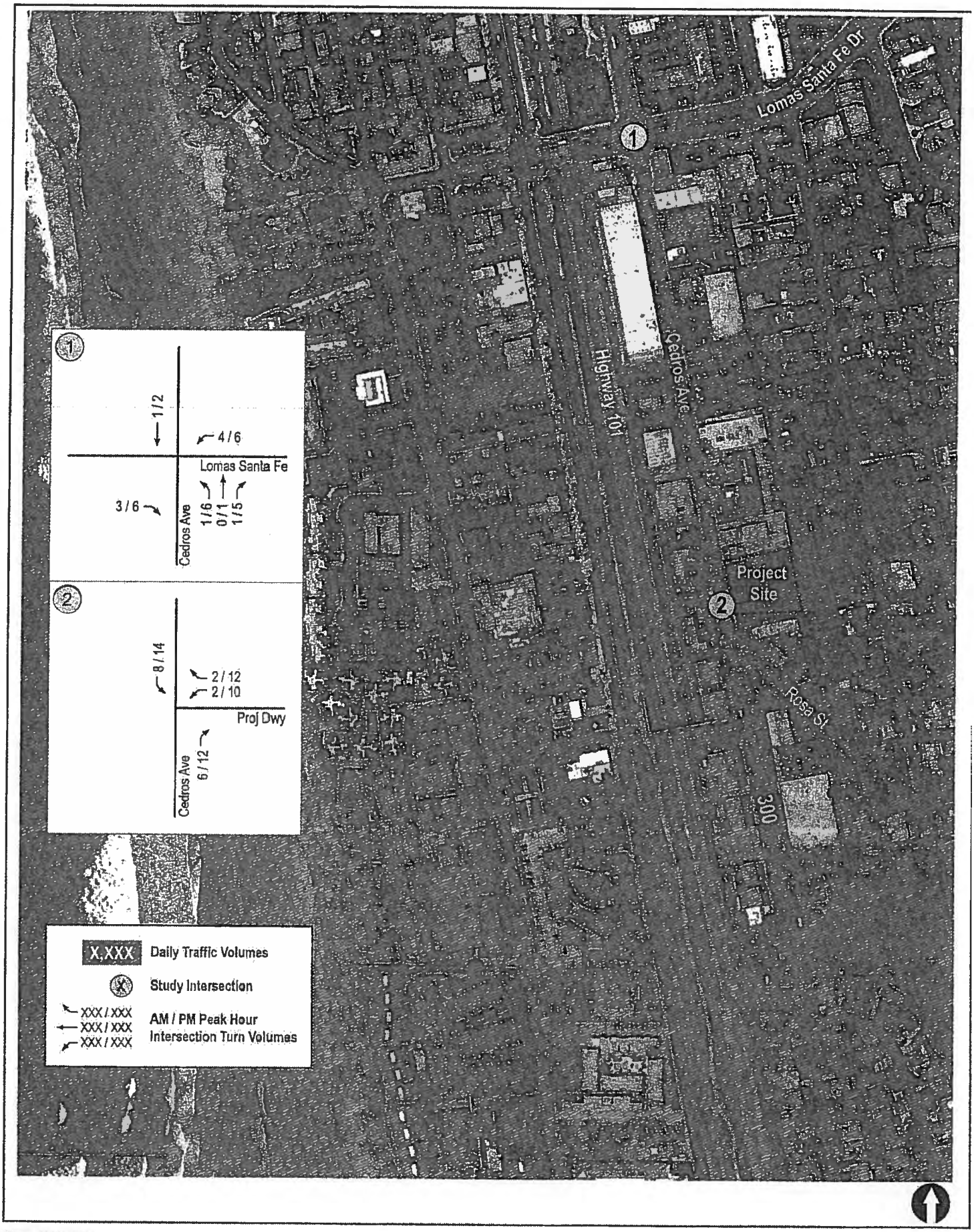
XXX ▬ = AVERAGE DAILY TRAFFIC VOLUMES

NOT TO SCALE

Kimley-Horn and Associates, Inc.

Figure 5

Project Trip Assignment



LINSCOTT LAW & GREENSPAN engineers

N:\2570\Figures
Date: 05/25/16

Figure 7-2

Project Traffic Volumes

CEDROS GARDENS MIXED-USE

APPENDIX F

NEAR TERM WITHOUT PROJECT SYNCHRO WORKSHEETS

HCM 6th Signalized Intersection Summary
1: Highway 101 & Plaza St./Lomas Santa Fe

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	168	24	156	142	216	34	173	126	436	747	66
Future Volume (vph)	39	168	24	156	142	216	34	173	126	436	747	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.98		1.00	0.94	0.85	1.00	0.94		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3455		3433	3176	1441	1770	3315		1770	3496	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3455		3433	3176	1441	1770	3315		1770	3496	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	43	187	27	173	158	240	38	192	140	484	830	73
RTOR Reduction (vph)	0	8	0	0	102	111	0	97	0	0	4	0
Lane Group Flow (vph)	0	249	0	173	171	14	38	235	0	484	899	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		14.8		13.6	13.6	13.6	4.6	37.0		38.6	71.0	
Effective Green, g (s)		14.8		13.6	13.6	13.6	4.6	37.0		38.6	71.0	
Actuated g/C Ratio		0.12		0.11	0.11	0.11	0.04	0.31		0.32	0.59	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		426		389	359	163	67	1022		569	2068	
v/s Ratio Prot		c0.07		0.05	c0.05		0.02	0.07		c0.27	c0.26	
v/s Ratio Perm						0.01						
v/c Ratio		0.58		0.44	0.48	0.09	0.57	0.23		0.85	0.43	
Uniform Delay, d1		49.7		49.7	49.9	47.6	56.7	30.9		38.0	13.5	
Progression Factor		1.00		1.00	1.00	1.00	1.16	0.95		1.00	1.00	
Incremental Delay, d2		2.0		0.8	1.0	0.2	10.5	0.5		11.7	0.7	
Delay (s)		51.7		50.5	50.9	47.9	76.5	30.0		49.7	14.1	
Level of Service		D		D	D	D	E	C		D	B	
Approach Delay (s)		51.7			50.1			34.7			26.5	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	523	111	74	395	62	60	16	74	63	13	67
Future Volume (veh/h)	66	523	111	74	395	62	60	16	74	63	13	67
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	73	581	123	82	439	69	67	18	82	70	14	74
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	750	158	106	1346	418	777	154	700	734	979	830
Arrive On Green	0.05	0.26	0.26	0.06	0.26	0.26	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1781	2920	616	1781	5106	1585	1309	293	1336	1295	1870	1585
Grp Volume(v), veh/h	73	353	351	82	439	69	67	0	100	70	14	74
Grp Sat Flow(s),veh/h/ln	1781	1777	1759	1781	1702	1585	1309	0	1630	1295	1870	1585
Q Serve(g_s), s	3.0	13.8	13.9	3.4	5.2	2.5	1.9	0.0	2.3	2.2	0.3	1.7
Cycle Q Clear(g_c), s	3.0	13.8	13.9	3.4	5.2	2.5	2.2	0.0	2.3	4.5	0.3	1.7
Prop In Lane	1.00		0.35	1.00		1.00	1.00		0.82	1.00		1.00
Lane Grp Cap(c), veh/h	94	456	452	106	1346	418	777	0	853	734	979	830
V/C Ratio(X)	0.78	0.77	0.78	0.77	0.33	0.17	0.09	0.00	0.12	0.10	0.01	0.09
Avail Cap(c_a), veh/h	190	640	633	214	1906	592	777	0	853	734	979	830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.56	0.56	0.56	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	25.8	25.9	34.8	22.3	21.3	9.1	0.0	9.1	10.2	8.6	8.9
Incr Delay (d2), s/veh	7.5	2.2	2.3	11.3	0.1	0.2	0.2	0.0	0.3	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	5.8	5.8	1.8	2.0	0.9	0.5	0.0	0.8	0.6	0.1	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.6	28.0	28.2	46.1	22.4	21.4	9.3	0.0	9.3	10.5	8.6	9.1
LnGrp LOS	D	C	C	D	C	C	A	A	A	B	A	A
Approach Vol, veh/h		777			590			167			158	
Approach Delay, s/veh		29.5			25.6			9.3			9.7	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		43.3	8.5	23.3		43.3	8.0	23.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		27.0	9.0	27.0		27.0	8.0	28.0
Max Q Clear Time (g_c+I1), s		4.3	5.4	15.9		6.5	5.0	7.2
Green Ext Time (p_c), s		0.7	0.0	3.4		0.5	0.0	3.1

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	3	1	33	0	38	0	103	45	20	109	0
Future Volume (vph)	3	3	1	33	0	38	0	103	45	20	109	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	3	1	37	0	42	0	114	50	22	121	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	7	79	164	143
Volume Left (vph)	3	37	0	22
Volume Right (vph)	1	42	50	0
Hadj (s)	0.03	-0.19	-0.15	0.06
Departure Headway (s)	4.7	4.4	4.1	4.3
Degree Utilization, x	0.01	0.10	0.19	0.17
Capacity (veh/h)	700	758	849	799
Control Delay (s)	7.7	7.9	8.0	8.2
Approach Delay (s)	7.7	7.9	8.0	8.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	30	57	261	862	37
Future Volume (vph)	50	30	57	261	862	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.95		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1716		1770	3539	3517	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1716		1770	3539	3517	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	33	63	290	958	41
RTOR Reduction (vph)	28	0	0	0	1	0
Lane Group Flow (vph)	61	0	63	290	998	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	10.8		8.4	100.7	88.3	
Effective Green, g (s)	10.8		8.4	100.7	88.3	
Actuated g/C Ratio	0.09		0.07	0.84	0.74	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	154		123	2969	2587	
v/s Ratio Prot	c0.04		c0.04	0.08	c0.28	
v/s Ratio Perm						
v/c Ratio	0.39		0.51	0.10	0.39	
Uniform Delay, d1	51.5		53.8	1.7	5.8	
Progression Factor	1.00		0.76	2.37	0.73	
Incremental Delay, d2	1.7		3.5	0.1	0.4	
Delay (s)	53.2		44.4	4.1	4.7	
Level of Service	D		D	A	A	
Approach Delay (s)	53.2			11.3	4.7	
Approach LOS	D			B	A	

Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	146	36	147	108	183	20	176	147	389	468	16
Future Volume (veh/h)	6	146	36	147	108	183	20	176	147	389	468	16
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	7	162	40	163	120	203	22	196	163	432	520	18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	309	74	253	405	343	31	1477	659	478	2335	81
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.02	0.42	0.42	0.09	0.22	0.22
Sat Flow, veh/h	22	1427	343	1180	1870	1585	1781	3554	1585	1781	3504	121
Grp Volume(v), veh/h	209	0	0	163	120	203	22	196	163	432	263	275
Grp Sat Flow(s),veh/h/ln	1792	0	0	1180	1870	1585	1781	1777	1585	1781	1777	1849
Q Serve(g_s), s	0.0	0.0	0.0	10.1	6.4	13.8	1.5	4.1	8.0	28.8	14.6	14.6
Cycle Q Clear(g_c), s	12.3	0.0	0.0	22.4	6.4	13.8	1.5	4.1	8.0	28.8	14.6	14.6
Prop In Lane	0.03		0.19	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	419	0	0	253	405	343	31	1477	659	478	1184	1232
V/C Ratio(X)	0.50	0.00	0.00	0.64	0.30	0.59	0.71	0.13	0.25	0.90	0.22	0.22
Avail Cap(c_a), veh/h	552	0	0	342	546	462	89	1477	659	787	1184	1232
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	41.7	0.0	0.0	47.6	39.4	42.3	58.7	21.7	22.8	53.2	21.3	21.3
Incr Delay (d2), s/veh	0.9	0.0	0.0	2.7	0.4	1.6	26.0	0.2	0.9	8.2	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	5.6	0.0	0.0	4.9	3.0	5.6	0.9	1.8	3.2	14.9	7.1	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.6	0.0	0.0	50.3	39.8	43.9	84.7	21.9	23.7	61.3	21.7	21.7
LnGrp LOS	D	A	A	D	D	D	F	C	C	E	C	C
Approach Vol, veh/h		209			486			381			970	
Approach Delay, s/veh		42.6			45.0			26.3			39.3	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	36.2	53.9		30.0	6.1	84.0		30.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	53.0	20.0		35.0	6.0	67.0		35.0
Max Q Clear Time (g_c+I1), s	30.8	10.0		14.3	3.5	16.6		24.4
Green Ext Time (p_c), s	1.3	1.2		1.1	0.0	3.6		1.5

Intersection Summary		
HCM 6th Ctrl Delay		38.6
HCM 6th LOS		D

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	241	22	245	215	514	44	769	167	303	419	53
Future Volume (vph)	96	241	22	245	215	514	44	769	167	303	419	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.99		1.00	0.92	0.85	1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3461		3433	3113	1441	1770	3444		1770	3480	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3461		3433	3113	1441	1770	3444		1770	3480	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	107	268	24	272	239	571	49	854	186	337	466	59
RTOR Reduction (vph)	0	4	0	0	187	238	0	15	0	0	8	0
Lane Group Flow (vph)	0	395	0	272	338	47	49	1025	0	337	517	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		18.5		19.8	19.8	19.8	6.0	39.5		26.2	59.7	
Effective Green, g (s)		18.5		19.8	19.8	19.8	6.0	39.5		26.2	59.7	
Actuated g/C Ratio		0.15		0.17	0.17	0.17	0.05	0.33		0.22	0.50	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		533		566	513	237	88	1133		386	1731	
v/s Ratio Prot		c0.11		0.08	c0.11		0.03	c0.30		c0.19	0.15	
v/s Ratio Perm						0.03						
v/c Ratio		0.74		0.48	0.66	0.20	0.56	0.90		0.87	0.30	
Uniform Delay, d1		48.5		45.4	46.9	43.2	55.7	38.4		45.3	17.8	
Progression Factor		1.00		1.00	1.00	1.00	1.12	0.75		1.00	1.00	
Incremental Delay, d2		5.5		0.6	3.1	0.4	7.1	11.4		19.0	0.4	
Delay (s)		53.9		46.1	50.0	43.7	69.6	40.1		64.3	18.2	
Level of Service		D		D	D	D	E	D		E	B	
Approach Delay (s)		53.9			47.3			41.5			36.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
2: Cedros Ave. & Lomas Santa Fe/Lomas Santa Fe Dr.

Near Term PM
06/30/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	507	68	110	711	46	104	41	138	100	30	140
Future Volume (veh/h)	81	507	68	110	711	46	104	41	138	100	30	140
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	90	563	76	122	790	51	116	46	153	111	33	156
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	116	739	99	155	1311	407	705	197	655	631	969	821
Arrive On Green	0.06	0.23	0.23	0.09	0.26	0.26	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1781	3147	424	1781	5106	1585	1194	380	1263	1183	1870	1585
Grp Volume(v), veh/h	90	317	322	122	790	51	116	0	199	111	33	156
Grp Sat Flow(s),veh/h/ln	1781	1777	1794	1781	1702	1585	1194	0	1643	1183	1870	1585
Q Serve(g_s), s	3.7	12.5	12.5	5.0	10.2	1.9	4.0	0.0	5.0	4.3	0.6	3.9
Cycle Q Clear(g_c), s	3.7	12.5	12.5	5.0	10.2	1.9	4.6	0.0	5.0	9.2	0.6	3.9
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.77	1.00		1.00
Lane Grp Cap(c), veh/h	116	417	421	155	1311	407	705	0	851	631	969	821
V/C Ratio(X)	0.78	0.76	0.76	0.79	0.60	0.13	0.16	0.00	0.23	0.18	0.03	0.19
Avail Cap(c_a), veh/h	166	616	622	214	1906	592	705	0	851	631	969	821
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.49	0.49	0.49	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.5	26.7	26.8	33.6	24.5	21.4	10.0	0.0	9.9	12.4	8.9	9.7
Incr Delay (d2), s/veh	7.0	1.6	1.6	12.4	0.4	0.1	0.5	0.0	0.6	0.6	0.1	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	5.2	5.3	2.6	4.0	0.7	1.0	0.0	1.8	1.2	0.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.5	28.3	28.4	46.0	25.0	21.5	10.5	0.0	10.5	13.0	8.9	10.2
LnGrp LOS	D	C	C	D	C	C	B	A	B	B	A	B
Approach Vol, veh/h		729			963			315			300	
Approach Delay, s/veh		30.0			27.4			10.5			11.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		42.9	10.5	21.6		42.9	8.9	23.3				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0				
Max Green Setting (Gmax), s		28.0	9.0	26.0		28.0	7.0	28.0				
Max Q Clear Time (g_c+I1), s		7.0	7.0	14.5		11.2	5.7	12.2				
Green Ext Time (p_c), s		1.6	0.1	3.1		1.0	0.0	5.1				

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	1	1	33	1	54	2	142	54	40	98	3
Future Volume (vph)	1	1	1	33	1	54	2	142	54	40	98	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	1	1	37	1	60	2	158	60	44	109	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	3	98	220	156
Volume Left (vph)	1	37	2	44
Volume Right (vph)	1	60	60	3
Hadj (s)	-0.10	-0.26	-0.13	0.08
Departure Headway (s)	4.8	4.5	4.2	4.4
Degree Utilization, x	0.00	0.12	0.26	0.19
Capacity (veh/h)	681	737	832	776
Control Delay (s)	7.8	8.1	8.6	8.5
Approach Delay (s)	7.8	8.1	8.6	8.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.5		
Level of Service	A		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	75	45	48	893	705	61
Future Volume (vph)	75	45	48	893	705	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.95		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1715		1770	3539	3497	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1715		1770	3539	3497	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	83	50	53	992	783	68
RTOR Reduction (vph)	21	0	0	0	3	0
Lane Group Flow (vph)	112	0	53	992	848	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	13.3		7.9	98.2	86.3	
Effective Green, g (s)	13.3		7.9	98.2	86.3	
Actuated g/C Ratio	0.11		0.07	0.82	0.72	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	190		116	2896	2514	
v/s Ratio Prot	c0.07		c0.03	c0.28	0.24	
v/s Ratio Perm						
v/c Ratio	0.59		0.46	0.34	0.34	
Uniform Delay, d1	50.7		54.0	2.8	6.2	
Progression Factor	1.00		0.77	2.62	0.45	
Incremental Delay, d2	4.6		2.4	0.3	0.4	
Delay (s)	55.3		44.1	7.5	3.2	
Level of Service	E		D	A	A	
Approach Delay (s)	55.3			9.3	3.2	
Approach LOS	E			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	128	64	239	163	525	36	567	138	264	319	31
Future Volume (veh/h)	10	128	64	239	163	525	36	567	138	264	319	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	11	142	71	266	181	583	40	630	153	293	354	34
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	389	186	407	639	542	51	1347	601	320	1736	166
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.03	0.38	0.38	0.36	1.00	1.00
Sat Flow, veh/h	34	1139	544	1168	1870	1585	1781	3554	1585	1781	3278	313
Grp Volume(v), veh/h	224	0	0	266	181	583	40	630	153	293	191	197
Grp Sat Flow(s),veh/h/ln	1717	0	0	1168	1870	1585	1781	1777	1585	1781	1777	1814
Q Serve(g_s), s	0.0	0.0	0.0	18.8	8.5	41.0	2.7	16.1	8.0	18.9	0.0	0.0
Cycle Q Clear(g_c), s	11.5	0.0	0.0	30.2	8.5	41.0	2.7	16.1	8.0	18.9	0.0	0.0
Prop In Lane	0.05		0.32	1.00		1.00	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	618	0	0	407	639	542	51	1347	601	320	941	961
V/C Ratio(X)	0.36	0.00	0.00	0.65	0.28	1.08	0.78	0.47	0.25	0.92	0.20	0.21
Avail Cap(c_a), veh/h	618	0	0	407	639	542	119	1347	601	475	941	961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	29.8	0.0	0.0	37.8	28.8	39.5	57.9	28.1	25.6	37.6	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	3.7	0.2	60.9	22.0	1.2	1.0	16.4	0.5	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	4.9	0.0	0.0	7.5	3.9	24.8	1.5	7.0	3.2	8.3	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.1	0.0	0.0	41.5	29.0	100.4	79.9	29.3	26.6	54.0	0.5	0.5
LnGrp LOS	C	A	A	D	C	F	E	C	C	D	A	A
Approach Vol, veh/h		224			1030			823			681	
Approach Delay, s/veh		30.1			72.6			31.3			23.5	
Approach LOS		C			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	25.5	49.5		45.0	7.5	67.5		45.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	32.0	35.0		41.0	8.0	59.0		41.0
Max Q Clear Time (g_c+I1), s	20.9	18.1		13.5	4.7	2.0		43.0
Green Ext Time (p_c), s	0.7	4.5		1.4	0.0	2.5		0.0

Intersection Summary		
HCM 6th Ctrl Delay		44.7
HCM 6th LOS		D

APPENDIX G

NEAR TERM WITH PROJECT SYNCHRO WORKSHEETS

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	170	24	180	142	216	34	175	130	436	761	66
Future Volume (vph)	40	170	24	180	142	216	34	175	130	436	761	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.98		1.00	0.94	0.85	1.00	0.94		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3455		3433	3176	1441	1770	3313		1770	3497	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3455		3433	3176	1441	1770	3313		1770	3497	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	189	27	200	158	240	38	194	144	484	846	73
RTOR Reduction (vph)	0	8	0	0	101	110	0	96	0	0	4	0
Lane Group Flow (vph)	0	252	0	200	172	15	38	242	0	484	915	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		14.9		14.3	14.3	14.3	4.6	40.0		34.8	70.2	
Effective Green, g (s)		14.9		14.3	14.3	14.3	4.6	40.0		34.8	70.2	
Actuated g/C Ratio		0.12		0.12	0.12	0.12	0.04	0.33		0.29	0.59	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		428		409	378	171	67	1104		513	2045	
v/s Ratio Prot		c0.07		c0.06	0.05		0.02	0.07		c0.27	c0.26	
v/s Ratio Perm						0.01						
v/c Ratio		0.59		0.49	0.45	0.09	0.57	0.22		0.94	0.45	
Uniform Delay, d1		49.7		49.4	49.2	47.0	56.7	28.8		41.6	14.0	
Progression Factor		1.00		1.00	1.00	1.00	1.30	0.51		1.00	1.00	
Incremental Delay, d2		2.1		0.9	0.9	0.2	10.5	0.5		26.1	0.7	
Delay (s)		51.7		50.4	50.1	47.3	84.2	15.2		67.8	14.7	
Level of Service		D		D	D	D	F	B		E	B	
Approach Delay (s)		51.7			49.6			22.2			33.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	528	111	74	413	62	62	16	74	63	13	70
Future Volume (veh/h)	66	528	111	74	413	62	62	16	74	63	13	70
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	73	587	123	82	459	69	69	18	82	70	14	78
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	785	164	95	1375	427	767	152	693	726	969	821
Arrive On Green	0.05	0.27	0.27	0.05	0.27	0.27	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1781	2926	611	1781	5106	1585	1304	293	1336	1295	1870	1585
Grp Volume(v), veh/h	73	356	354	82	459	69	69	0	100	70	14	78
Grp Sat Flow(s),veh/h/ln	1781	1777	1760	1781	1702	1585	1304	0	1630	1295	1870	1585
Q Serve(g_s), s	3.0	13.7	13.8	3.4	5.4	2.5	2.0	0.0	2.4	2.2	0.3	1.9
Cycle Q Clear(g_c), s	3.0	13.7	13.8	3.4	5.4	2.5	2.3	0.0	2.4	4.6	0.3	1.9
Prop In Lane	1.00		0.35	1.00		1.00	1.00		0.82	1.00		1.00
Lane Grp Cap(c), veh/h	93	477	472	95	1375	427	767	0	845	726	969	821
V/C Ratio(X)	0.78	0.75	0.75	0.86	0.33	0.16	0.09	0.00	0.12	0.10	0.01	0.09
Avail Cap(c_a), veh/h	119	806	798	95	2247	697	767	0	845	726	969	821
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.46	0.46	0.46	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	25.1	25.1	35.2	22.0	20.9	9.3	0.0	9.3	10.4	8.8	9.2
Incr Delay (d2), s/veh	11.2	1.1	1.1	51.2	0.1	0.2	0.2	0.0	0.3	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	5.6	5.6	2.8	2.1	0.9	0.6	0.0	0.8	0.6	0.1	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.3	26.2	26.2	86.5	22.1	21.1	9.6	0.0	9.6	10.7	8.8	9.4
LnGrp LOS	D	C	C	F	C	C	A	A	A	B	A	A
Approach Vol, veh/h		783			610			169			162	
Approach Delay, s/veh		28.1			30.7			9.6			9.9	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		42.9	8.0	24.1		42.9	7.9	24.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		25.0	4.0	34.0		25.0	5.0	33.0
Max Q Clear Time (g_c+I1), s		4.4	5.4	15.8		6.6	5.0	7.4
Green Ext Time (p_c), s		0.7	0.0	4.3		0.5	0.0	3.5

Intersection Summary	
HCM 6th Ctrl Delay	25.5
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	10	1	33	1	40	0	103	45	29	110	0
Future Volume (vph)	3	10	1	33	1	40	0	103	45	29	110	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	11	1	37	1	44	0	114	50	32	122	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	15	82	164	154
Volume Left (vph)	3	37	0	32
Volume Right (vph)	1	44	50	0
Hadj (s)	0.03	-0.20	-0.15	0.08
Departure Headway (s)	4.7	4.4	4.1	4.4
Degree Utilization, x	0.02	0.10	0.19	0.19
Capacity (veh/h)	694	751	837	790
Control Delay (s)	7.8	7.9	8.1	8.4
Approach Delay (s)	7.8	7.9	8.1	8.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.2		
Level of Service	A		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	57	45	117	261	862	76
Future Volume (vph)	57	45	117	261	862	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.94		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1704		1770	3539	3496	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1704		1770	3539	3496	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	63	50	130	290	958	84
RTOR Reduction (vph)	27	0	0	0	4	0
Lane Group Flow (vph)	86	0	130	290	1038	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	12.0		14.0	99.5	81.5	
Effective Green, g (s)	12.0		14.0	99.5	81.5	
Actuated g/C Ratio	0.10		0.12	0.83	0.68	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	170		206	2934	2374	
v/s Ratio Prot	c0.05		c0.07	0.08	c0.30	
v/s Ratio Perm						
v/c Ratio	0.51		0.63	0.10	0.44	
Uniform Delay, d1	51.2		50.5	1.9	8.8	
Progression Factor	1.00		0.78	2.11	0.44	
Incremental Delay, d2	2.4		6.0	0.1	0.5	
Delay (s)	53.5		45.3	4.1	4.4	
Level of Service	D		D	A	A	
Approach Delay (s)	53.5			16.8	4.4	
Approach LOS	D			B	A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	146	36	147	108	226	20	188	147	399	471	16
Future Volume (veh/h)	6	146	36	147	108	226	20	188	147	399	471	16
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	7	162	40	163	120	251	22	209	163	443	523	18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	237	57	187	312	264	31	1675	747	467	2510	86
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.02	0.47	0.47	0.52	1.00	1.00
Sat Flow, veh/h	23	1424	342	1180	1870	1585	1781	3554	1585	1781	3505	120
Grp Volume(v), veh/h	209	0	0	163	120	251	22	209	163	443	265	276
Grp Sat Flow(s),veh/h/ln	1789	0	0	1180	1870	1585	1781	1777	1585	1781	1777	1849
Q Serve(g_s), s	0.9	0.0	0.0	6.9	6.9	18.8	1.5	4.0	7.3	28.3	0.0	0.0
Cycle Q Clear(g_c), s	13.1	0.0	0.0	20.0	6.9	18.8	1.5	4.0	7.3	28.3	0.0	0.0
Prop In Lane	0.03		0.19	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	329	0	0	187	312	264	31	1675	747	467	1272	1324
V/C Ratio(X)	0.63	0.00	0.00	0.87	0.38	0.95	0.71	0.12	0.22	0.95	0.21	0.21
Avail Cap(c_a), veh/h	329	0	0	187	312	264	89	1675	747	638	1272	1324
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	47.1	0.0	0.0	53.7	44.5	49.5	58.7	17.8	18.7	27.8	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	0.0	33.7	0.8	41.8	26.0	0.2	0.7	18.6	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	0.0	6.7	3.3	10.5	0.9	1.7	2.8	11.3	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.1	0.0	0.0	87.4	45.3	91.3	84.7	18.0	19.4	46.3	0.3	0.3
LnGrp LOS	D	A	A	F	D	F	F	B	B	D	A	A
Approach Vol, veh/h		209			534			394			984	
Approach Delay, s/veh		51.1			79.8			22.3			21.0	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.4	60.6		24.0	6.1	89.9		24.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	43.0	45.0		20.0	6.0	82.0		20.0
Max Q Clear Time (g_c+I1), s	30.3	9.3		15.1	3.5	2.0		22.0
Green Ext Time (p_c), s	1.2	2.0		0.5	0.0	3.7		0.0

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

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	73	95	101	18	2
Future Volume (Veh/h)	11	73	95	101	18	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	79	103	110	20	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			218			
pX, platoon unblocked						
vC, conflicting volume	213				261	158
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	213				261	158
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	100
cM capacity (veh/h)	1357				721	887

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	91	213	22
Volume Left	12	0	20
Volume Right	0	110	2
cSH	1357	1700	734
Volume to Capacity	0.01	0.13	0.03
Queue Length 95th (ft)	1	0	2
Control Delay (s)	1.1	0.0	10.1
Lane LOS	A		B
Approach Delay (s)	1.1	0.0	10.1
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	4	145	1	1	133
Future Volume (Veh/h)	6	4	145	1	1	133
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	4	158	1	1	145
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	306	158			159	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306	158			159	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	686	887			1420	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	11	159	146
Volume Left	7	0	1
Volume Right	4	1	0
cSH	748	1700	1420
Volume to Capacity	0.01	0.09	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.9	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	241	22	261	216	514	44	783	190	303	429	53
Future Volume (vph)	96	241	22	261	216	514	44	783	190	303	429	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.99		1.00	0.92	0.85	1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3461		3433	3114	1441	1770	3436		1770	3481	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3461		3433	3114	1441	1770	3436		1770	3481	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	107	268	24	290	240	571	49	870	211	337	477	59
RTOR Reduction (vph)	0	4	0	0	182	237	0	18	0	0	7	0
Lane Group Flow (vph)	0	395	0	290	344	48	49	1063	0	337	529	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		18.5		20.1	20.1	20.1	6.0	43.0		22.4	59.4	
Effective Green, g (s)		18.5		20.1	20.1	20.1	6.0	43.0		22.4	59.4	
Actuated g/C Ratio		0.15		0.17	0.17	0.17	0.05	0.36		0.19	0.49	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		533		575	521	241	88	1231		330	1723	
v/s Ratio Prot		c0.11		0.08	c0.11		0.03	c0.31		c0.19	0.15	
v/s Ratio Perm						0.03						
v/c Ratio		0.74		0.50	0.66	0.20	0.56	0.86		1.02	0.31	
Uniform Delay, d1		48.5		45.4	46.7	43.0	55.7	35.8		48.8	18.0	
Progression Factor		1.00		1.00	1.00	1.00	1.29	0.60		1.00	1.00	
Incremental Delay, d2		5.5		0.7	3.0	0.4	7.0	7.8		55.1	0.5	
Delay (s)		53.9		46.1	49.8	43.4	78.9	29.3		103.9	18.5	
Level of Service		D		D	D	D	E	C		F	B	
Approach Delay (s)		53.9			47.2			31.5			51.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	43.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	525	70	110	725	46	105	41	138	100	30	142
Future Volume (veh/h)	84	525	70	110	725	46	105	41	138	100	30	142
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	93	583	78	122	806	51	117	46	153	111	33	158
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	753	101	155	1323	411	698	195	649	625	961	815
Arrive On Green	0.07	0.24	0.24	0.09	0.26	0.26	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1781	3151	421	1781	5106	1585	1192	380	1263	1183	1870	1585
Grp Volume(v), veh/h	93	328	333	122	806	51	117	0	199	111	33	158
Grp Sat Flow(s),veh/h/ln	1781	1777	1795	1781	1702	1585	1192	0	1643	1183	1870	1585
Q Serve(g_s), s	3.9	12.9	13.0	5.0	10.4	1.8	4.0	0.0	5.0	4.3	0.7	4.0
Cycle Q Clear(g_c), s	3.9	12.9	13.0	5.0	10.4	1.8	4.7	0.0	5.0	9.3	0.7	4.0
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.77	1.00		1.00
Lane Grp Cap(c), veh/h	119	425	429	155	1323	411	698	0	844	625	961	815
V/C Ratio(X)	0.78	0.77	0.78	0.79	0.61	0.12	0.17	0.00	0.24	0.18	0.03	0.19
Avail Cap(c_a), veh/h	166	592	598	214	1838	571	698	0	844	625	961	815
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.37	0.37	0.37	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	26.6	26.7	33.6	24.4	21.3	10.2	0.0	10.1	12.7	9.0	9.8
Incr Delay (d2), s/veh	5.7	1.6	1.6	12.4	0.5	0.1	0.5	0.0	0.7	0.6	0.1	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	5.4	5.5	2.6	4.1	0.7	1.1	0.0	1.8	1.2	0.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	28.2	28.3	46.0	24.9	21.4	10.7	0.0	10.7	13.3	9.1	10.4
LnGrp LOS	D	C	C	D	C	C	B	A	B	B	A	B
Approach Vol, veh/h		754			979			316			302	
Approach Delay, s/veh		29.7			27.3			10.7			11.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		42.5	10.5	21.9		42.5	9.0	23.4
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		29.0	9.0	25.0		29.0	7.0	27.0
Max Q Clear Time (g_c+I1), s		7.0	7.0	15.0		11.3	5.9	12.4
Green Ext Time (p_c), s		1.6	0.1	2.9		1.0	0.0	5.0

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	7	1	33	8	61	2	142	54	44	98	3
Future Volume (vph)	1	7	1	33	8	61	2	142	54	44	98	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	8	1	37	9	68	2	158	60	49	109	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	10	114	220	161
Volume Left (vph)	1	37	2	49
Volume Right (vph)	1	68	60	3
Hadj (s)	-0.01	-0.26	-0.13	0.08
Departure Headway (s)	4.9	4.5	4.3	4.5
Degree Utilization, x	0.01	0.14	0.26	0.20
Capacity (veh/h)	660	733	815	761
Control Delay (s)	8.0	8.3	8.7	8.7
Approach Delay (s)	8.0	8.3	8.7	8.7
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.6		
Level of Service	A		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	116	108	100	893	705	94
Future Volume (vph)	116	108	100	893	705	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.93		1.00	1.00	0.98	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1698		1770	3539	3477	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1698		1770	3539	3477	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	129	120	111	992	783	104
RTOR Reduction (vph)	34	0	0	0	6	0
Lane Group Flow (vph)	215	0	111	992	881	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	20.5		12.8	91.0	74.2	
Effective Green, g (s)	20.5		12.8	91.0	74.2	
Actuated g/C Ratio	0.17		0.11	0.76	0.62	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	290		188	2683	2149	
v/s Ratio Prot	c0.13		c0.06	0.28	c0.25	
v/s Ratio Perm						
v/c Ratio	0.74		0.59	0.37	0.41	
Uniform Delay, d1	47.2		51.1	4.9	11.7	
Progression Factor	1.00		0.78	2.65	0.51	
Incremental Delay, d2	9.8		4.0	0.3	0.6	
Delay (s)	57.0		43.8	13.2	6.5	
Level of Service	E		D	B	A	
Approach Delay (s)	57.0			16.3	6.5	
Approach LOS	E			B	A	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	128	64	239	163	555	36	575	138	305	331	31
Future Volume (veh/h)	10	128	64	239	163	555	36	575	138	305	331	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	11	142	71	266	181	617	40	639	153	339	368	34
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	379	181	396	623	528	51	1282	572	367	1770	163
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.03	0.36	0.36	0.34	0.90	0.90
Sat Flow, veh/h	34	1137	543	1168	1870	1585	1781	3554	1585	1781	3290	302
Grp Volume(v), veh/h	224	0	0	266	181	617	40	639	153	339	198	204
Grp Sat Flow(s),veh/h/ln	1714	0	0	1168	1870	1585	1781	1777	1585	1781	1777	1816
Q Serve(g_s), s	0.0	0.0	0.0	19.1	8.6	40.0	2.7	16.8	8.2	22.0	1.7	1.7
Cycle Q Clear(g_c), s	11.6	0.0	0.0	30.7	8.6	40.0	2.7	16.8	8.2	22.0	1.7	1.7
Prop In Lane	0.05		0.32	1.00		1.00	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	603	0	0	396	623	528	51	1282	572	367	956	977
V/C Ratio(X)	0.37	0.00	0.00	0.67	0.29	1.17	0.78	0.50	0.27	0.92	0.21	0.21
Avail Cap(c_a), veh/h	603	0	0	396	623	528	119	1282	572	490	956	977
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	30.5	0.0	0.0	38.8	29.5	40.0	57.9	29.9	27.1	38.5	2.9	2.9
Incr Delay (d2), s/veh	0.4	0.0	0.0	4.4	0.3	94.5	22.0	1.4	1.1	18.6	0.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	0.0	7.7	3.9	29.2	1.5	7.4	3.3	10.4	0.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.9	0.0	0.0	43.2	29.8	134.5	79.9	31.3	28.3	57.0	3.4	3.4
LnGrp LOS	C	A	A	D	C	F	E	C	C	E	A	A
Approach Vol, veh/h		224			1064			832			741	
Approach Delay, s/veh		30.9			93.8			33.1			27.9	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	28.7	47.3		44.0	7.5	68.5		44.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	33.0	35.0		40.0	8.0	60.0		40.0
Max Q Clear Time (g_c+I1), s	24.0	18.8		13.6	4.7	3.7		42.0
Green Ext Time (p_c), s	0.7	4.5		1.4	0.0	2.6		0.0

Intersection Summary	
HCM 6th Ctrl Delay	54.2
HCM 6th LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	95	111	85	107	12
Future Volume (Veh/h)	9	95	111	85	107	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	103	121	92	116	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			219			
pX, platoon unblocked						
vC, conflicting volume	213				290	167
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	213				290	167
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				83	99
cM capacity (veh/h)	1357				695	877

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	113	213	129
Volume Left	10	0	116
Volume Right	0	92	13
cSH	1357	1700	710
Volume to Capacity	0.01	0.13	0.18
Queue Length 95th (ft)	1	0	16
Control Delay (s)	0.7	0.0	11.2
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	11.2
Approach LOS			B

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	0	202	2	2	145
Future Volume (Veh/h)	1	0	202	2	2	145
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	220	2	2	158
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	383	221			222	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	383	221			222	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	619	819			1347	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	222	160
Volume Left	1	0	2
Volume Right	0	2	0
cSH	619	1700	1347
Volume to Capacity	0.00	0.13	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	10.8	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.8	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX H

HORIZON YEAR 2035 FACTORING WORKSHEETS

Year 2035 Without Project

Intersection 1

Analyst: Henryk Pedersen
Intersection: Highway 101 / Lomas Santa Fe Dr.
Future Condition: Year 2035 Without Project
Date: 12/2/2014
Company: Urban Systems Associates, Inc.
Project Number: 003314
Intersection Control: Signalized

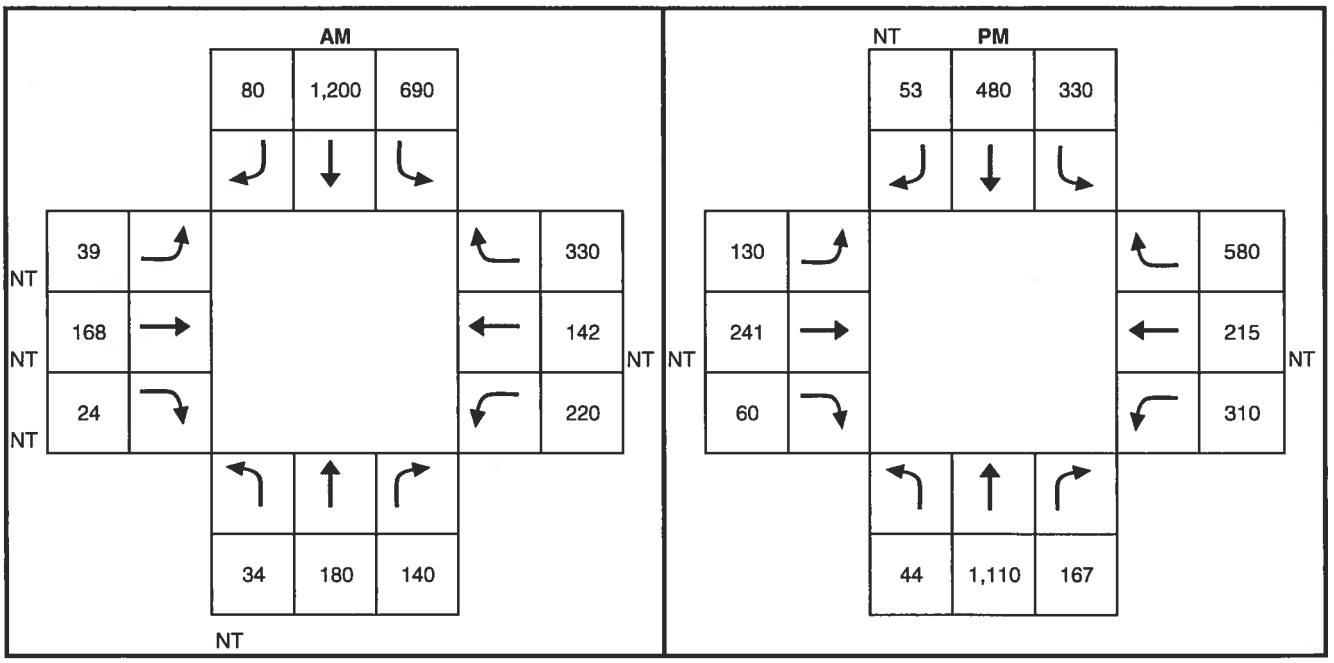
E/W Street Name: Lomas Santa Fe Dr.
N/S Street Name: Highway 101

Factored Turns

Note: Majority of volumes are from LLG 2035 volumes.
If NT was larger than LLG volume, NT was used.

LLG Volumes

Turn Movement	Near Term turn (v) AM	Near Term turn (v) PM	LLG AM	LLG PM	2035 AM turn (v) AM	2035 PM turn (v) PM
NLT	34	44	30	40	34	44
NTH	173	769	180	1,110	180	1110
NRT	126	167	140	160	140	167
SLT	436	303	690	330	690	330
STH	747	419	1,200	480	1200	480
SRT	66	53	80	40	80	53
ELT	39	96	30	130	39	130
ETH	168	241	140	180	168	241
ERT	24	22	20	60	24	60
WLT	156	245	220	310	220	310
WTH	142	215	140	150	142	215
WRT	216	514	330	580	330	580



Delay	LOS
47.6	D

Delay	LOS
69.9	E

Year 2035 Without Project

Intersection 2

Analyst: Henryk Pedersen
Intersection: Cedros Ave. / Lomas Santa Fe Dr.
Future Conditio Year 2035 Without Project
Date: 12/2/2014
Company: Urban Systems Associates, Inc.
Project Numbe 003314
Intersection Control: Signalized

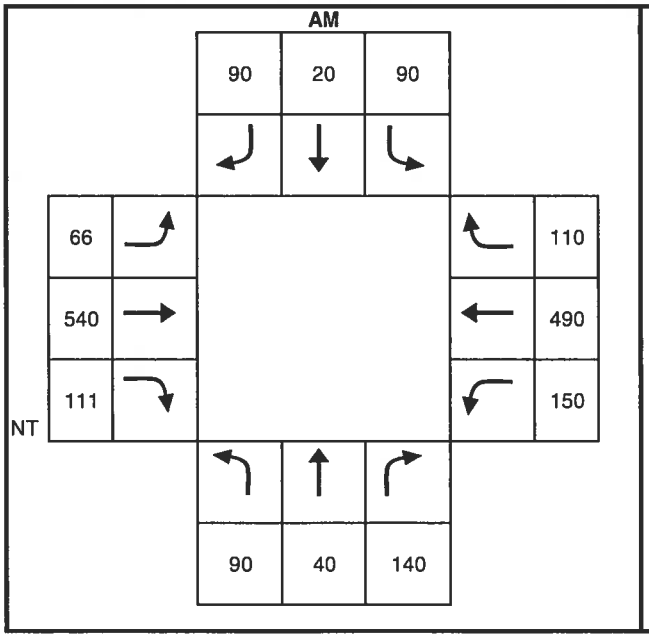
E/W Street Name: Lomas Santa Fe Dr.
N/S Street Name: Cedros Ave.

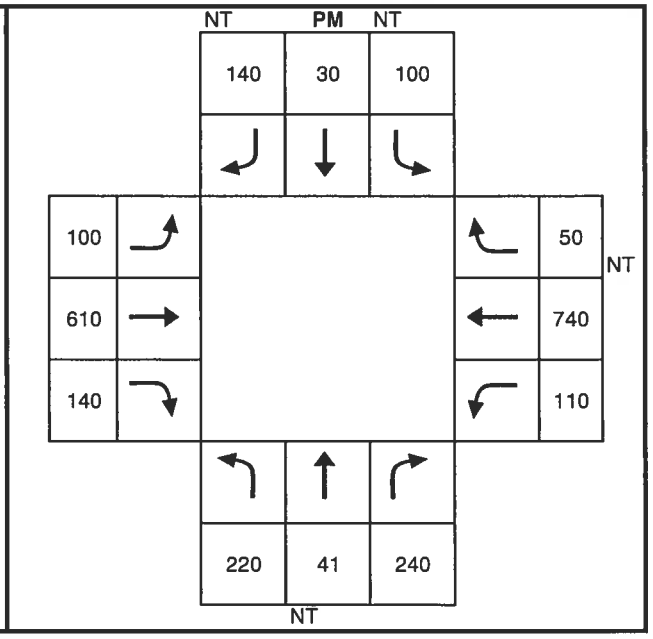
Factored Turns

Note: Majority of volumes are from LLG 2035 volumes.
If NT was larger than LLG volume, NT was used.

LLG Volumes

Turn Movement	Near Term turn (v) AM	Near Term turn (v) PM	LLG AM	LLG PM	2035 AM turn (v) AM	2035 PM turn (v) PM
NLT	60	104	90	220	90	220
NTH	16	41	40	30	40	41
NRT	74	138	140	240	140	240
SLT	63	100	90	100	90	100
STH	13	30	20	20	20	30
SRT	67	140	90	90	90	140
ELT	66	81	50	100	66	100
ETH	523	507	540	610	540	610
ERT	111	68	70	140	111	140
WLT	74	110	150	110	150	110
WTH	395	711	490	740	490	740
WRT	62	46	110	50	110	50





Delay	LOS
25.0	C

Delay	LOS
24.5	C

Year 2035 Without Project

Intersection 3

Analyst: Henryk Pedersen
Intersection: Sierra Ave. / Dahlia Dr.
Future Conditio Year 2035 Without Project
Date: 12/2/2014
Company: Urban Systems Associates, Inc.
Project Numbe 003314
Intersection Control: Unsignalized

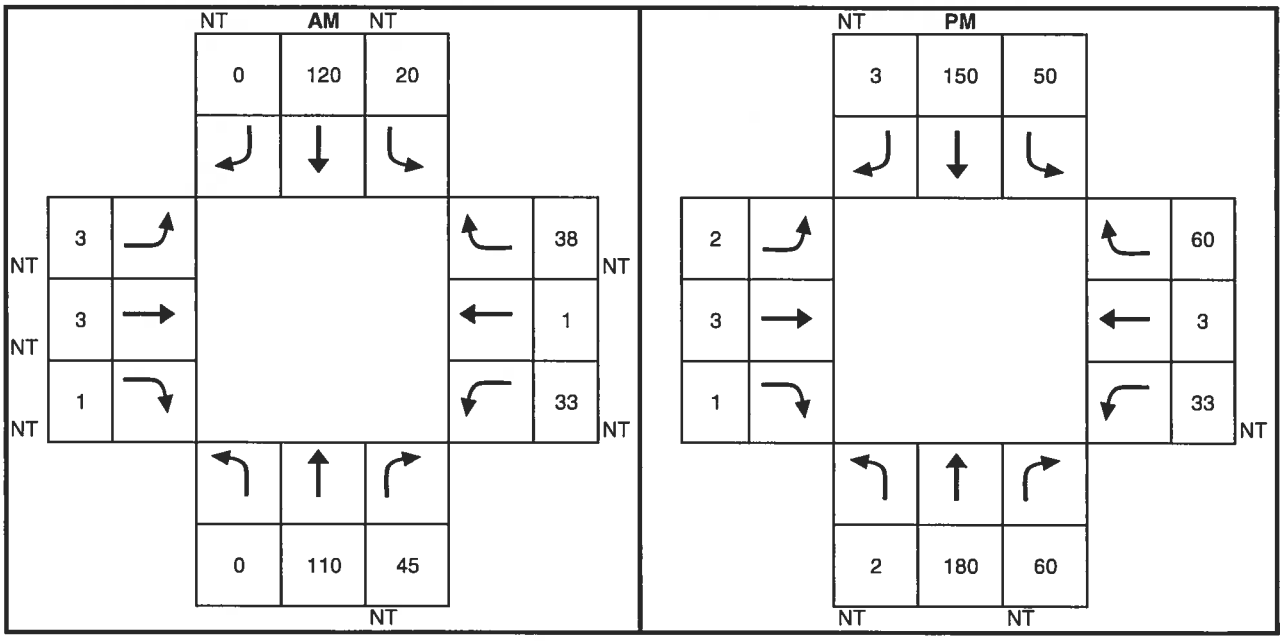
E/W Street Name: Dahlia Dr.
N/S Street Name: Sierra Ave.

Factored Turns

Note: Majority of volumes are from LLG 2035 volumes.
If NT was larger than LLG volume, NT was used.

LLG Volumes

Turn Movement	Near Term turn (v) AM	Near Term turn (v) PM	LLG AM	LLG PM	2035 AM turn (v) AM	2035 PM turn (v) PM
NLT	0	2	0	0	0	2
NTH	103	142	110	180	110	180
NRT	45	54	30	60	45	60
SLT	20	40	20	50	20	50
STH	109	98	120	150	120	150
SRT	0	3	0	1	0	3
ELT	3	1	0	2	3	2
ETH	3	1	3	3	3	3
ERT	1	1	0	1	1	1
WLT	33	33	30	20	33	33
WTH	0	1	1	3	1	3
WRT	38	54	20	60	38	60



Delay	LOS
8.2	A

Delay	LOS
9.2	A

Note: segment volumes that are being compared to find the % increase are the segment opposing

Year 2035 Without Project

Intersection 4

Analyst: Henryk Pedersen
Intersection: Highway 101 / Dahlia Dr.
Future Conditio Year 2035 Without Project
Date: 12/2/2014
Company: Urban Systems Associates, Inc.
Project Numbe 003314
Intersection Control: Signalized

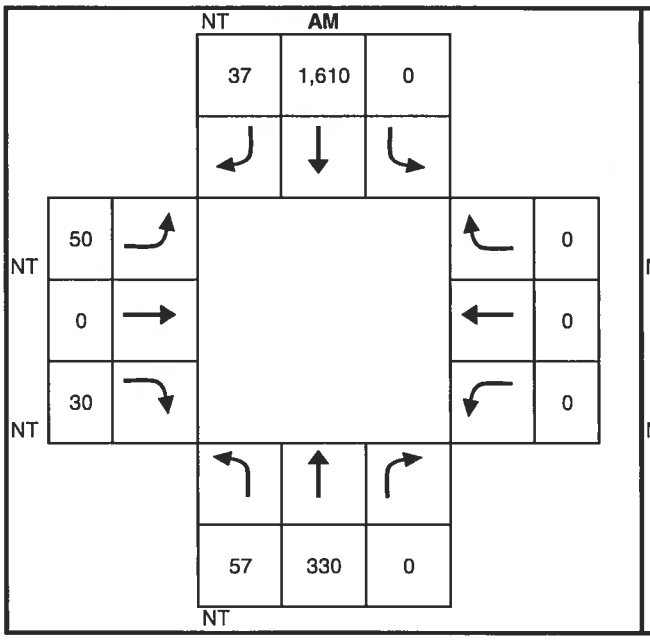
E/W Street Name: Dahlia Dr.
N/S Street Name: Highway 101

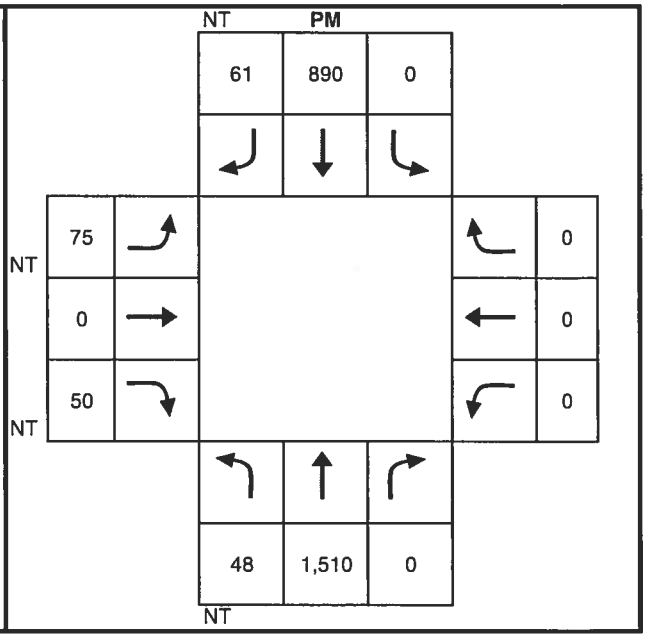
Factored Turns

Note: Majority of volumes are from LLG 2035 volumes.
If NT was larger than LLG volume, NT was used.

LLG Volumes

Turn Movement	Near Term turn (v) AM	Near Term turn (v) PM	LLG AM	LLG PM	2035 AM turn (v) AM	2035 PM turn (v) PM
NLT	57	48	30	40	57	48
NTH	261	893	330	1,510	330	1510
NRT	0	0	0	0	0	0
SLT	0	0	0	0	0	0
STH	862	705	1,610	890	1610	890
SRT	37	61	30	40	37	61
ELT	50	75	30	70	50	75
ETH	0	0	0	0	0	0
ERT	30	45	30	50	30	50
WLT	0	0	0	0	0	0
WTH	0	0	0	0	0	0
WRT	0	0	0	0	0	0





Delay	LOS
12.5	B

Delay	LOS
10.0	B

Year 2035 Without Project

Intersection 5

Analyst: Henryk Pedersen
Intersection: Highway 101 / Via de la Valle
Future Conditio Year 2035 Without Project
Date: 12/2/2014
Company: Urban Systems Associates, Inc.
Project Numbe 003314
Intersection Control: Signalized

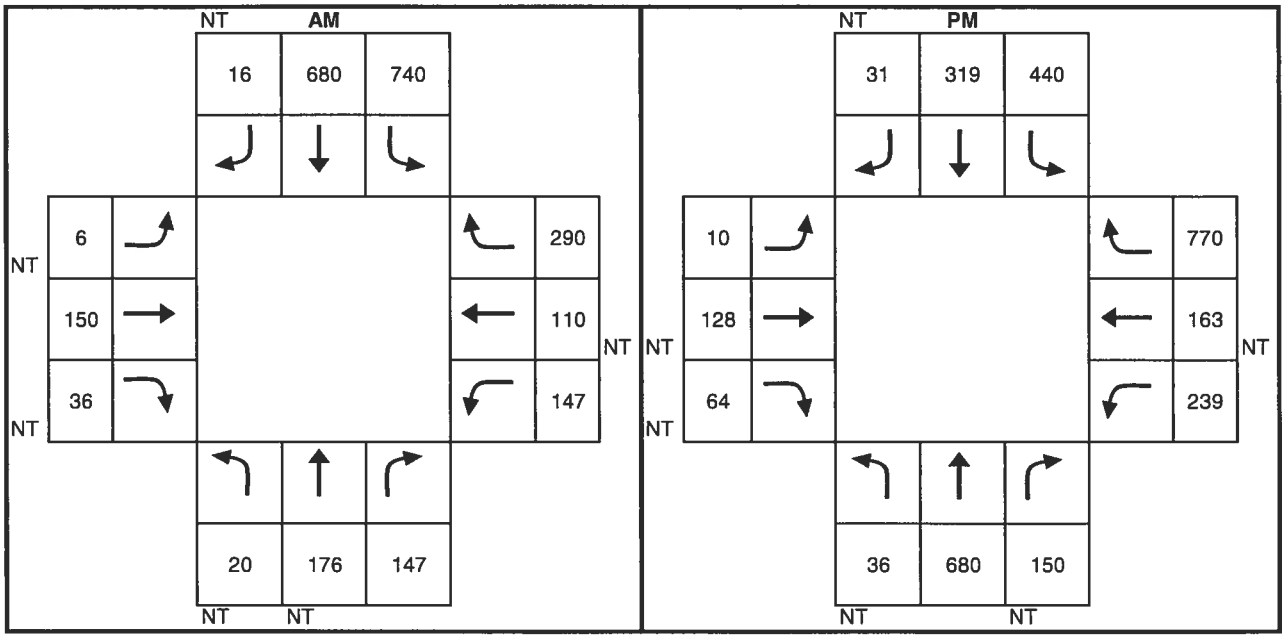
E/W Street Name: Via de la Valle
N/S Street Name: Highway 101

Factored Turns

Note: Majority of volumes are from LLG 2035 volumes.
If NT was larger than LLG volume, NT was used.

LLG Volumes

Turn Movement	Near Term turn (v) AM	Near Term turn (v) PM	LLG AM	LLG PM	2035 AM turn (v) AM	2035 PM turn (v) PM
NLT	20	36	10	30	20	36
NTH	176	567	150	680	176	680
NRT	147	138	130	150	147	150
SLT	389	264	740	440	740	440
STH	468	319	680	310	680	319
SRT	16	31	10	10	16	31
ELT	6	10	0	10	6	10
ETH	146	128	150	110	150	128
ERT	36	64	30	30	36	64
WLT	147	239	140	200	147	239
WTH	108	163	110	110	110	163
WRT	183	525	290	770	290	770



Delay	LOS
40.6	D

Delay	LOS
45.0	D

APPENDIX I

HORIZON YEAR 2035 WITHOUT PROJECT SYNCHRO WORKSHEETS

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	168	24	220	142	330	34	180	140	690	1200	80
Future Volume (vph)	39	168	24	220	142	330	34	180	140	690	1200	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.98		1.00	0.92	0.85	1.00	0.93		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3455		3433	3117	1441	1770	3307		1770	3506	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3455		3433	3117	1441	1770	3307		1770	3506	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	43	187	27	244	158	367	38	200	156	767	1333	89
RTOR Reduction (vph)	0	7	0	0	160	159	0	108	0	0	3	0
Lane Group Flow (vph)	0	250	0	244	182	24	38	248	0	767	1419	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		15.3		16.7	16.7	16.7	6.1	30.1		51.9	75.9	
Effective Green, g (s)		15.3		16.7	16.7	16.7	6.1	30.1		51.9	75.9	
Actuated g/C Ratio		0.12		0.13	0.13	0.13	0.05	0.23		0.40	0.58	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		406		441	400	185	83	765		706	2046	
v/s Ratio Prot		c0.07		c0.07	0.06		0.02	0.08		c0.43	c0.40	
v/s Ratio Perm						0.02						
v/c Ratio		0.62		0.55	0.45	0.13	0.46	0.32		1.09	0.69	
Uniform Delay, d1		54.6		53.2	52.4	50.2	60.3	41.5		39.1	18.9	
Progression Factor		1.00		1.00	1.00	1.00	1.16	0.51		1.00	1.00	
Incremental Delay, d2		2.8		1.5	0.8	0.3	3.9	1.1		59.7	2.0	
Delay (s)		57.3		54.7	53.3	50.5	73.9	22.2		98.8	20.9	
Level of Service		E		D	D	D	E	C		F	C	
Approach Delay (s)		57.3			53.0			27.2			48.2	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	47.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	540	111	150	490	110	90	40	140	90	20	90
Future Volume (veh/h)	66	540	111	150	490	110	90	40	140	90	20	90
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	73	600	123	167	544	122	100	44	156	100	22	100
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	776	159	190	1624	504	684	169	600	564	878	744
Arrive On Green	0.05	0.26	0.26	0.11	0.32	0.32	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	1781	2938	601	1781	5106	1585	1269	361	1279	1182	1870	1585
Grp Volume(v), veh/h	73	362	361	167	544	122	100	0	200	100	22	100
Grp Sat Flow(s),veh/h/ln	1781	1777	1762	1781	1702	1585	1269	0	1640	1182	1870	1585
Q Serve(g_s), s	3.0	14.1	14.2	6.9	6.1	4.3	3.4	0.0	5.5	4.2	0.5	2.7
Cycle Q Clear(g_c), s	3.0	14.1	14.2	6.9	6.1	4.3	3.9	0.0	5.5	9.7	0.5	2.7
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.78	1.00		1.00
Lane Grp Cap(c), veh/h	93	469	465	190	1624	504	684	0	770	564	878	744
V/C Ratio(X)	0.78	0.77	0.78	0.88	0.33	0.24	0.15	0.00	0.26	0.18	0.03	0.13
Avail Cap(c_a), veh/h	95	663	658	190	2179	676	684	0	770	564	878	744
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.17	0.17	0.17	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	25.5	25.5	33.0	19.5	18.9	11.7	0.0	12.0	15.0	10.7	11.3
Incr Delay (d2), s/veh	6.9	0.6	0.7	34.2	0.1	0.2	0.5	0.0	0.8	0.7	0.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	5.8	5.7	4.7	2.3	1.5	1.0	0.0	2.0	1.2	0.2	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	26.2	26.2	67.2	19.6	19.1	12.2	0.0	12.8	15.6	10.7	11.6
LnGrp LOS	D	C	C	E	B	B	B	A	B	B	B	B
Approach Vol, veh/h		796			833			300			222	
Approach Delay, s/veh		27.6			29.1			12.6			13.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		39.2	12.0	23.8		39.2	7.9	27.9				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0				
Max Green Setting (Gmax), s		27.0	8.0	28.0		27.0	4.0	32.0				
Max Q Clear Time (g_c+I1), s		7.5	8.9	16.2		11.7	5.0	8.1				
Green Ext Time (p_c), s		1.5	0.0	3.6		0.7	0.0	4.3				

Intersection Summary	
HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	3	1	33	1	38	0	110	45	20	120	0
Future Volume (vph)	3	3	1	33	1	38	0	110	45	20	120	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	3	1	37	1	42	0	122	50	22	133	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	7	80	172	155
Volume Left (vph)	3	37	0	22
Volume Right (vph)	1	42	50	0
Hadj (s)	0.03	-0.19	-0.14	0.06
Departure Headway (s)	4.8	4.4	4.1	4.3
Degree Utilization, x	0.01	0.10	0.20	0.19
Capacity (veh/h)	691	748	843	797
Control Delay (s)	7.8	7.9	8.1	8.3
Approach Delay (s)	7.8	7.9	8.1	8.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.2		
Level of Service	A		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	30	57	330	1610	37
Future Volume (vph)	50	30	57	330	1610	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.95		1.00	1.00	1.00	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1716		1770	3539	3527	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1716		1770	3539	3527	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	33	63	367	1789	41
RTOR Reduction (vph)	17	0	0	0	1	0
Lane Group Flow (vph)	72	0	63	367	1829	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	11.6		7.6	109.9	98.3	
Effective Green, g (s)	11.6		7.6	109.9	98.3	
Actuated g/C Ratio	0.09		0.06	0.85	0.76	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	153		103	2991	2666	
v/s Ratio Prot	c0.04		c0.04	0.10	c0.52	
v/s Ratio Perm						
v/c Ratio	0.47		0.61	0.12	0.69	
Uniform Delay, d1	56.3		59.8	1.7	8.0	
Progression Factor	1.00		0.77	1.38	1.19	
Incremental Delay, d2	2.3		9.5	0.1	1.2	
Delay (s)	58.5		55.3	2.5	10.8	
Level of Service	E		E	A	B	
Approach Delay (s)	58.5			10.2	10.8	
Approach LOS	E			B	B	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	150	36	147	110	290	20	176	147	740	680	16
Future Volume (veh/h)	6	150	36	147	110	290	20	176	147	740	680	16
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	7	167	40	163	122	322	22	196	163	822	756	18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	33	320	75	249	417	354	30	732	326	853	2369	56
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.02	0.21	0.21	0.48	0.67	0.67
Sat Flow, veh/h	21	1433	334	1175	1870	1585	1781	3554	1585	1781	3548	84
Grp Volume(v), veh/h	214	0	0	163	122	322	22	196	163	822	379	395
Grp Sat Flow(s),veh/h/ln	1789	0	0	1175	1870	1585	1781	1777	1585	1781	1777	1855
Q Serve(g_s), s	0.0	0.0	0.0	11.5	7.0	25.7	1.6	6.0	11.8	58.1	11.7	11.7
Cycle Q Clear(g_c), s	13.5	0.0	0.0	25.0	7.0	25.7	1.6	6.0	11.8	58.1	11.7	11.7
Prop In Lane	0.03		0.19	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	428	0	0	249	417	354	30	732	326	853	1186	1239
V/C Ratio(X)	0.50	0.00	0.00	0.65	0.29	0.91	0.73	0.27	0.50	0.96	0.32	0.32
Avail Cap(c_a), veh/h	482	0	0	285	475	402	82	732	326	932	1186	1239
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.68
Uniform Delay (d), s/veh	44.5	0.0	0.0	51.4	42.0	49.2	63.6	43.4	45.7	32.8	9.1	9.1
Incr Delay (d2), s/veh	0.9	0.0	0.0	4.3	0.4	22.7	28.6	0.9	5.4	15.8	0.5	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	6.2	0.0	0.0	5.5	3.3	12.4	1.0	2.8	5.2	28.1	4.5	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.4	0.0	0.0	55.7	42.4	72.0	92.2	44.3	51.1	48.6	9.6	9.6
LnGrp LOS	D	A	A	E	D	E	F	D	D	D	A	A
Approach Vol, veh/h		214			607			381			1596	
Approach Delay, s/veh		45.4			61.6			50.0			29.7	
Approach LOS		D			E			D			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	66.2	30.8		33.0	6.2	90.8		33.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	68.0	17.0		33.0	6.0	79.0		33.0
Max Q Clear Time (g_c+I1), s	60.1	13.8		15.5	3.6	13.7		27.7
Green Ext Time (p_c), s	2.2	0.5		1.1	0.0	5.8		1.3

Intersection Summary			
HCM 6th Ctrl Delay			40.6
HCM 6th LOS			D

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	241	60	310	215	580	44	1110	167	330	480	53
Future Volume (vph)	130	241	60	310	215	580	44	1110	167	330	480	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.98		1.00	0.91	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3414		3433	3098	1441	1770	3470		1770	3486	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3414		3433	3098	1441	1770	3470		1770	3486	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	254	63	326	226	611	46	1168	176	347	505	56
RTOR Reduction (vph)	0	10	0	0	191	256	0	9	0	0	6	0
Lane Group Flow (vph)	0	444	0	326	341	49	46	1335	0	347	555	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		21.7		20.8	20.8	20.8	6.4	45.0		26.5	65.1	
Effective Green, g (s)		21.7		20.8	20.8	20.8	6.4	45.0		26.5	65.1	
Actuated g/C Ratio		0.17		0.16	0.16	0.16	0.05	0.35		0.20	0.50	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		569		549	495	230	87	1201		360	1745	
v/s Ratio Prot		c0.13		0.09	c0.11		0.03	c0.38		c0.20	0.16	
v/s Ratio Perm						0.03						
v/c Ratio		0.78		0.59	0.69	0.21	0.53	1.11		0.96	0.32	
Uniform Delay, d1		51.9		50.7	51.6	47.5	60.3	42.5		51.3	19.3	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.9		1.7	4.0	0.5	5.7	62.2		37.7	0.5	
Delay (s)		58.7		52.4	55.5	47.9	66.0	104.7		88.9	19.7	
Level of Service		E		D	E	D	E	F		F	B	
Approach Delay (s)		58.7			52.7			103.4			46.2	
Approach LOS		E			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	69.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	610	140	110	740	50	220	41	240	100	30	140
Future Volume (veh/h)	100	610	140	110	740	50	220	41	240	100	30	140
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	111	678	156	122	822	56	244	46	267	111	33	156
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	141	829	190	155	1513	470	639	111	642	455	869	736
Arrive On Green	0.08	0.29	0.29	0.09	0.30	0.30	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	1781	2869	660	1781	5106	1585	1194	238	1383	1067	1870	1585
Grp Volume(v), veh/h	111	420	414	122	822	56	244	0	313	111	33	156
Grp Sat Flow(s),veh/h/ln	1781	1777	1752	1781	1702	1585	1194	0	1621	1067	1870	1585
Q Serve(g_s), s	4.6	16.5	16.5	5.0	10.1	1.9	10.5	0.0	9.6	5.8	0.7	4.4
Cycle Q Clear(g_c), s	4.6	16.5	16.5	5.0	10.1	1.9	11.2	0.0	9.6	15.4	0.7	4.4
Prop In Lane	1.00		0.38	1.00		1.00	1.00		0.85	1.00		1.00
Lane Grp Cap(c), veh/h	141	513	506	155	1513	470	639	0	753	455	869	736
V/C Ratio(X)	0.79	0.82	0.82	0.79	0.54	0.12	0.38	0.00	0.42	0.24	0.04	0.21
Avail Cap(c_a), veh/h	166	616	607	190	1838	571	639	0	753	455	869	736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.39	0.39	0.39	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.9	24.8	24.8	33.6	22.1	19.3	14.0	0.0	13.3	18.4	10.9	11.9
Incr Delay (d2), s/veh	8.1	3.0	3.0	16.4	0.3	0.1	1.7	0.0	1.7	1.3	0.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	7.0	6.9	2.8	3.9	0.7	2.9	0.0	3.6	1.5	0.3	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	27.8	27.9	49.9	22.4	19.4	15.7	0.0	15.0	19.7	11.0	12.6
LnGrp LOS	D	C	C	D	C	B	B	A	B	B	B	B
Approach Vol, veh/h		945			1000			557			300	
Approach Delay, s/veh		29.5			25.6			15.3			15.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		38.8	10.5	25.7		38.8	9.9	26.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		29.0	8.0	26.0		29.0	7.0	27.0
Max Q Clear Time (g_c+I1), s		13.2	7.0	18.5		17.4	6.6	12.1
Green Ext Time (p_c), s		2.7	0.0	3.1		0.9	0.0	5.2

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	3	1	33	3	60	2	180	60	50	150	3
Future Volume (vph)	2	3	1	33	3	60	2	180	60	50	150	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	3	1	37	3	67	2	200	67	56	167	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	6	107	269	226
Volume Left (vph)	2	37	2	56
Volume Right (vph)	1	67	67	3
Hadj (s)	0.00	-0.27	-0.11	0.08
Departure Headway (s)	5.2	4.7	4.3	4.5
Degree Utilization, x	0.01	0.14	0.32	0.29
Capacity (veh/h)	613	684	804	759
Control Delay (s)	8.2	8.5	9.4	9.4
Approach Delay (s)	8.2	8.5	9.4	9.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.2		
Level of Service	A		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	75	50	48	1510	890	61
Future Volume (vph)	75	50	48	1510	890	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.95		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1710		1770	3539	3505	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1710		1770	3539	3505	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	83	56	53	1678	989	68
RTOR Reduction (vph)	17	0	0	0	2	0
Lane Group Flow (vph)	122	0	53	1678	1055	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	16.2		8.7	125.3	112.6	
Effective Green, g (s)	16.2		8.7	125.3	112.6	
Actuated g/C Ratio	0.11		0.06	0.84	0.75	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	184		102	2956	2631	
v/s Ratio Prot	c0.07		0.03	c0.47	0.30	
v/s Ratio Perm						
v/c Ratio	0.66		0.52	0.57	0.40	
Uniform Delay, d1	64.3		68.6	3.9	6.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	8.7		4.4	0.8	0.5	
Delay (s)	73.0		73.0	4.7	7.1	
Level of Service	E		E	A	A	
Approach Delay (s)	73.0			6.8	7.1	
Approach LOS	E			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	128	64	239	163	770	36	680	150	440	319	31
Future Volume (veh/h)	10	128	64	239	163	770	36	680	150	440	319	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	11	142	71	266	181	408	40	756	35	489	354	34
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	351	168	352	574	486	51	1107	494	516	1876	179
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.03	0.31	0.31	0.29	0.57	0.57
Sat Flow, veh/h	35	1144	547	1168	1870	1585	1781	3554	1585	1781	3278	313
Grp Volume(v), veh/h	224	0	0	266	181	408	40	756	35	489	191	197
Grp Sat Flow(s),veh/h/ln	1727	0	0	1168	1870	1585	1781	1777	1585	1781	1777	1814
Q Serve(g_s), s	0.0	0.0	0.0	22.5	9.7	31.2	2.9	24.2	2.0	34.9	6.7	6.8
Cycle Q Clear(g_c), s	13.1	0.0	0.0	35.5	9.7	31.2	2.9	24.2	2.0	34.9	6.7	6.8
Prop In Lane	0.05		0.32	1.00		1.00	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	559	0	0	352	574	486	51	1107	494	516	1017	1038
V/C Ratio(X)	0.40	0.00	0.00	0.76	0.32	0.84	0.78	0.68	0.07	0.95	0.19	0.19
Avail Cap(c_a), veh/h	625	0	0	398	647	549	110	1107	494	562	1017	1038
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	35.8	0.0	0.0	46.2	34.6	42.1	62.7	39.1	31.5	45.2	13.3	13.3
Incr Delay (d2), s/veh	0.5	0.0	0.0	7.2	0.3	10.2	21.7	3.4	0.3	23.4	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	5.8	0.0	0.0	9.0	4.5	13.5	1.6	11.1	0.8	18.7	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.2	0.0	0.0	53.4	34.9	52.2	84.4	42.6	31.8	68.6	13.7	13.7
LnGrp LOS	D	A	A	D	C	D	F	D	C	E	B	B
Approach Vol, veh/h		224			855			831			877	
Approach Delay, s/veh		36.2			48.9			44.1			44.3	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	41.6	44.5		43.9	7.8	78.4		43.9
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	41.0	32.0		45.0	8.0	65.0		45.0
Max Q Clear Time (g_c+I1), s	36.9	26.2		15.1	4.9	8.8		37.5
Green Ext Time (p_c), s	0.7	2.6		1.4	0.0	2.5		2.3

Intersection Summary		
HCM 6th Ctrl Delay		45.0
HCM 6th LOS		D

APPENDIX J

HORIZON YEAR 2035 WITH PROJECT SYNCHRO WORKSHEETS

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	170	24	244	142	330	34	182	144	690	1214	80
Future Volume (vph)	40	170	24	244	142	330	34	182	144	690	1214	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.98		1.00	0.92	0.85	1.00	0.93		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3455		3433	3117	1441	1770	3305		1770	3506	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3455		3433	3117	1441	1770	3305		1770	3506	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	189	27	271	158	367	38	202	160	767	1349	89
RTOR Reduction (vph)	0	7	0	0	159	158	0	111	0	0	3	0
Lane Group Flow (vph)	0	253	0	271	183	25	38	251	0	767	1435	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		15.4		17.8	17.8	17.8	6.0	32.0		48.8	74.8	
Effective Green, g (s)		15.4		17.8	17.8	17.8	6.0	32.0		48.8	74.8	
Actuated g/C Ratio		0.12		0.14	0.14	0.14	0.05	0.25		0.38	0.58	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		409		470	426	197	81	813		664	2017	
v/s Ratio Prot		c0.07		c0.08	0.06		0.02	0.08		c0.43	c0.41	
v/s Ratio Perm						0.02						
v/c Ratio		0.62		0.58	0.43	0.13	0.47	0.31		1.16	0.71	
Uniform Delay, d1		54.5		52.6	51.4	49.3	60.4	40.0		40.6	19.8	
Progression Factor		1.00		0.82	0.78	1.66	1.05	0.39		1.00	1.00	
Incremental Delay, d2		2.8		1.5	0.6	0.3	4.2	1.0		86.2	2.2	
Delay (s)		57.3		44.9	40.7	82.2	67.8	16.6		126.8	22.0	
Level of Service		E		D	D	F	E	B		F	C	
Approach Delay (s)		57.3			51.6			21.5			58.4	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	52.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	545	111	150	508	110	92	40	140	90	20	93
Future Volume (veh/h)	66	545	111	150	508	110	92	40	140	90	20	93
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	73	606	123	167	564	122	102	44	156	100	22	103
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	757	153	137	1439	447	110	129	458	110	670	568
Arrive On Green	0.05	0.26	0.26	0.08	0.28	0.28	0.06	0.36	0.36	0.06	0.36	0.36
Sat Flow, veh/h	1781	2944	596	1781	5106	1585	1781	361	1279	1781	1870	1585
Grp Volume(v), veh/h	73	365	364	167	564	122	102	0	200	100	22	103
Grp Sat Flow(s),veh/h/ln	1781	1777	1763	1781	1702	1585	1781	0	1640	1781	1870	1585
Q Serve(g_s), s	2.6	12.5	12.6	5.0	5.8	3.9	3.7	0.0	5.8	3.6	0.5	2.9
Cycle Q Clear(g_c), s	2.6	12.5	12.6	5.0	5.8	3.9	3.7	0.0	5.8	3.6	0.5	2.9
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.78	1.00		1.00
Lane Grp Cap(c), veh/h	93	457	453	137	1439	447	110	0	588	110	670	568
V/C Ratio(X)	0.78	0.80	0.80	1.22	0.39	0.27	0.93	0.00	0.34	0.91	0.03	0.18
Avail Cap(c_a), veh/h	137	547	542	137	1571	488	110	0	588	110	670	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	22.6	22.6	30.0	18.8	18.2	30.4	0.0	15.2	30.3	13.5	14.3
Incr Delay (d2), s/veh	1.7	0.7	0.7	147.3	0.2	0.3	64.2	0.0	1.6	59.0	0.1	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	1.1	4.9	4.9	7.7	2.2	1.4	3.5	0.0	2.2	3.3	0.2	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.1	23.3	23.3	177.3	19.0	18.5	94.5	0.0	16.8	89.3	13.6	15.0
LnGrp LOS	C	C	C	F	B	B	F	A	B	F	B	B
Approach Vol, veh/h		802			853			302			225	
Approach Delay, s/veh		24.1			49.9			43.1			47.9	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	27.3	9.0	20.7	8.0	27.3	7.4	22.3
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	20.0	5.0	20.0	4.0	20.0	5.0	20.0
Max Q Clear Time (g_c+I1), s	5.6	7.8	7.0	14.6	5.7	4.9	4.6	7.8
Green Ext Time (p_c), s	0.0	0.9	0.0	2.2	0.0	0.3	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	39.3
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	10	1	33	2	40	0	110	45	29	121	0
Future Volume (vph)	3	10	1	33	2	40	0	110	45	29	121	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	11	1	37	2	44	0	122	50	32	134	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	15	83	172	166
Volume Left (vph)	3	37	0	32
Volume Right (vph)	1	44	50	0
Hadj (s)	0.03	-0.19	-0.14	0.07
Departure Headway (s)	4.8	4.5	4.2	4.4
Degree Utilization, x	0.02	0.10	0.20	0.20
Capacity (veh/h)	685	741	832	788
Control Delay (s)	7.9	8.0	8.2	8.5
Approach Delay (s)	7.9	8.0	8.2	8.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.3		
Level of Service	A		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	57	45	117	330	1610	76
Future Volume (vph)	57	45	117	330	1610	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.94		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1704		1770	3539	3515	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1704		1770	3539	3515	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	63	50	130	367	1789	84
RTOR Reduction (vph)	23	0	0	0	2	0
Lane Group Flow (vph)	90	0	130	367	1871	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	12.6		14.3	108.9	90.6	
Effective Green, g (s)	12.6		14.3	108.9	90.6	
Actuated g/C Ratio	0.10		0.11	0.84	0.70	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	165		194	2964	2449	
v/s Ratio Prot	c0.05		c0.07	0.10	c0.53	
v/s Ratio Perm						
v/c Ratio	0.54		0.67	0.12	0.76	
Uniform Delay, d1	56.0		55.6	1.9	12.8	
Progression Factor	1.00		0.75	3.39	1.17	
Incremental Delay, d2	3.6		7.9	0.1	1.9	
Delay (s)	59.6		49.6	6.6	16.8	
Level of Service	E		D	A	B	
Approach Delay (s)	59.6			17.8	16.8	
Approach LOS	E			B	B	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	150	36	147	110	333	20	188	147	750	683	16
Future Volume (veh/h)	6	150	36	147	110	333	20	188	147	750	683	16
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	7	167	40	163	122	370	22	209	163	833	759	18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	33	308	72	239	403	341	30	797	356	834	2396	57
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.02	0.22	0.22	0.78	1.00	1.00
Sat Flow, veh/h	21	1432	334	1175	1870	1585	1781	3554	1585	1781	3548	84
Grp Volume(v), veh/h	214	0	0	163	122	370	22	209	163	833	380	397
Grp Sat Flow(s),veh/h/ln	1787	0	0	1175	1870	1585	1781	1777	1585	1781	1777	1855
Q Serve(g_s), s	0.0	0.0	0.0	11.7	7.1	28.0	1.6	6.3	11.6	60.7	0.0	0.0
Cycle Q Clear(g_c), s	13.7	0.0	0.0	25.3	7.1	28.0	1.6	6.3	11.6	60.7	0.0	0.0
Prop In Lane	0.03		0.19	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	414	0	0	239	403	341	30	797	356	834	1200	1253
V/C Ratio(X)	0.52	0.00	0.00	0.68	0.30	1.08	0.73	0.26	0.46	1.00	0.32	0.32
Avail Cap(c_a), veh/h	414	0	0	239	403	341	82	797	356	945	1200	1253
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.56	0.56	0.56
Uniform Delay (d), s/veh	45.4	0.0	0.0	52.4	42.8	51.0	63.6	41.5	43.6	14.2	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	7.7	0.4	73.0	28.6	0.8	4.2	20.9	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	6.3	0.0	0.0	5.7	3.4	18.0	1.0	2.9	5.0	16.5	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.5	0.0	0.0	60.1	43.2	124.0	92.2	42.3	47.8	35.1	0.4	0.4
LnGrp LOS	D	A	A	E	D	F	F	D	D	D	A	A
Approach Vol, veh/h		214			655			394			1610	
Approach Delay, s/veh		46.5			93.0			47.4			18.3	
Approach LOS		D			F			D			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	66.7	31.3		32.0	6.2	91.8		32.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	69.0	21.0		28.0	6.0	84.0		28.0
Max Q Clear Time (g_c+I1), s	62.7	13.6		15.7	3.6	2.0		30.0
Green Ext Time (p_c), s	1.9	1.1		0.9	0.0	5.8		0.0

Intersection Summary		
HCM 6th Ctrl Delay		41.4
HCM 6th LOS		D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	73	93	101	18	2
Future Volume (Veh/h)	11	73	93	101	18	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	79	101	110	20	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			208			
pX, platoon unblocked						
vC, conflicting volume	211				259	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	211				259	156
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	100
cM capacity (veh/h)	1360				723	890

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	91	211	22
Volume Left	12	0	20
Volume Right	0	110	2
cSH	1360	1700	736
Volume to Capacity	0.01	0.12	0.03
Queue Length 95th (ft)	1	0	2
Control Delay (s)	1.1	0.0	10.0
Lane LOS	A		B
Approach Delay (s)	1.1	0.0	10.0
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	4	141	1	1	144
Future Volume (Veh/h)	6	4	141	1	1	144
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	4	153	1	1	157
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	312	154			154	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	312	154			154	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	680	892			1426	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	11	154	158
Volume Left	7	0	1
Volume Right	4	1	0
cSH	744	1700	1426
Volume to Capacity	0.01	0.09	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.9	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	241	60	326	216	580	44	1124	190	330	490	53
Future Volume (vph)	130	241	60	326	216	580	44	1124	190	330	490	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		0.97	0.91	0.91	1.00	0.95		1.00	0.95	
Frt		0.98		1.00	0.91	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3414		3433	3098	1441	1770	3462		1770	3487	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3414		3433	3098	1441	1770	3462		1770	3487	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	254	63	343	227	611	46	1183	200	347	516	56
RTOR Reduction (vph)	0	10	0	0	191	257	0	10	0	0	6	0
Lane Group Flow (vph)	0	444	0	343	342	48	46	1373	0	347	566	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		20.5		20.6	20.6	20.6	6.3	45.4		27.5	66.6	
Effective Green, g (s)		20.5		20.6	20.6	20.6	6.3	45.4		27.5	66.6	
Actuated g/C Ratio		0.16		0.16	0.16	0.16	0.05	0.35		0.21	0.51	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		538		543	490	228	85	1209		374	1786	
v/s Ratio Prot		c0.13		0.10	c0.11		0.03	c0.40		c0.20	0.16	
v/s Ratio Perm						0.03						
v/c Ratio		0.83		0.63	0.70	0.21	0.54	1.14		0.93	0.32	
Uniform Delay, d1		53.0		51.2	51.8	47.6	60.4	42.3		50.3	18.5	
Progression Factor		1.00		1.00	1.00	1.00	1.19	0.86		1.00	1.00	
Incremental Delay, d2		10.0		2.4	4.3	0.5	5.4	69.7		28.7	0.5	
Delay (s)		63.0		53.6	56.1	48.1	77.5	106.3		78.9	18.9	
Level of Service		E		D	E	D	E	F		E	B	
Approach Delay (s)		63.0			53.3			105.3			41.6	
Approach LOS		E			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	70.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	628	142	110	754	50	221	41	240	100	30	142
Future Volume (veh/h)	103	628	142	110	754	50	221	41	240	100	30	142
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	114	698	158	122	838	56	246	46	267	111	33	158
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	762	172	143	1420	441	285	86	500	143	527	447
Arrive On Green	0.07	0.26	0.26	0.08	0.28	0.28	0.16	0.36	0.36	0.08	0.28	0.28
Sat Flow, veh/h	1781	2879	651	1781	5106	1585	1781	238	1383	1781	1870	1585
Grp Volume(v), veh/h	114	431	425	122	838	56	246	0	313	111	33	158
Grp Sat Flow(s),veh/h/ln	1781	1777	1753	1781	1702	1585	1781	0	1621	1781	1870	1585
Q Serve(g_s), s	4.8	17.6	17.7	5.1	10.6	2.0	10.1	0.0	11.5	4.6	1.0	6.0
Cycle Q Clear(g_c), s	4.8	17.6	17.7	5.1	10.6	2.0	10.1	0.0	11.5	4.6	1.0	6.0
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.85	1.00		1.00
Lane Grp Cap(c), veh/h	119	470	464	143	1420	441	285	0	586	143	527	447
V/C Ratio(X)	0.96	0.92	0.92	0.86	0.59	0.13	0.86	0.00	0.53	0.78	0.06	0.35
Avail Cap(c_a), veh/h	119	474	468	143	1430	444	285	0	586	285	527	447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.37	0.37	0.37	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.9	26.8	26.8	34.1	23.4	20.3	30.7	0.0	18.9	33.8	19.7	21.5
Incr Delay (d2), s/veh	39.5	10.3	10.5	37.0	0.6	0.1	22.8	0.0	3.5	8.6	0.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	8.4	8.3	3.6	4.1	0.7	6.0	0.0	4.6	2.3	0.4	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.4	37.1	37.3	71.1	24.0	20.4	53.5	0.0	22.4	42.5	19.9	23.7
LnGrp LOS	E	D	D	E	C	C	D	A	C	D	B	C
Approach Vol, veh/h		970			1016			559			302	
Approach Delay, s/veh		41.6			29.5			36.1			30.2	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	31.1	10.0	23.9	16.0	25.1	9.0	24.9
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	12.0	21.0	6.0	20.0	12.0	21.0	5.0	21.0
Max Q Clear Time (g_c+I1), s	6.6	13.5	7.1	19.7	12.1	8.0	6.8	12.6
Green Ext Time (p_c), s	0.1	1.2	0.0	0.2	0.0	0.5	0.0	3.7

Intersection Summary	
HCM 6th Ctrl Delay	35.0
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	9	1	33	10	67	2	180	60	54	150	3
Future Volume (vph)	2	9	1	33	10	67	2	180	60	54	150	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	10	1	37	11	74	2	200	67	60	167	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	13	122	269	230
Volume Left (vph)	2	37	2	60
Volume Right (vph)	1	74	67	3
Hadj (s)	0.02	-0.27	-0.11	0.08
Departure Headway (s)	5.2	4.8	4.4	4.6
Degree Utilization, x	0.02	0.16	0.33	0.30
Capacity (veh/h)	604	679	788	745
Control Delay (s)	8.3	8.7	9.5	9.5
Approach Delay (s)	8.3	8.7	9.5	9.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.4		
Level of Service	A		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	116	113	100	1510	890	94
Future Volume (vph)	116	113	100	1510	890	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.93		1.00	1.00	0.99	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1696		1770	3539	3489	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1696		1770	3539	3489	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	129	126	111	1678	989	104
RTOR Reduction (vph)	30	0	0	0	5	0
Lane Group Flow (vph)	225	0	111	1678	1088	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	22.5		13.2	99.0	81.8	
Effective Green, g (s)	22.5		13.2	99.0	81.8	
Actuated g/C Ratio	0.17		0.10	0.76	0.63	
Clearance Time (s)	4.0		4.0	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	293		179	2695	2195	
v/s Ratio Prot	c0.13		0.06	c0.47	0.31	
v/s Ratio Perm						
v/c Ratio	0.77		0.62	0.62	0.50	
Uniform Delay, d1	51.3		56.0	7.0	13.0	
Progression Factor	1.00		0.83	2.13	0.54	
Incremental Delay, d2	11.5		3.6	0.6	0.8	
Delay (s)	62.7		50.1	15.6	7.8	
Level of Service	E		D	B	A	
Approach Delay (s)	62.7			17.7	7.8	
Approach LOS	E			B	A	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	128	64	239	163	800	36	688	150	481	331	31
Future Volume (veh/h)	10	128	64	239	163	800	36	688	150	481	331	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	11	142	57	266	181	453	40	764	31	534	368	28
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	381	146	370	582	493	51	1027	458	548	1901	144
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.03	0.29	0.29	0.41	0.76	0.76
Sat Flow, veh/h	38	1226	471	1183	1870	1585	1781	3554	1585	1781	3348	254
Grp Volume(v), veh/h	210	0	0	266	181	453	40	764	31	534	195	201
Grp Sat Flow(s),veh/h/ln	1734	0	0	1183	1870	1585	1781	1777	1585	1781	1777	1825
Q Serve(g_s), s	0.0	0.0	0.0	21.6	9.6	35.8	2.9	25.3	1.8	38.3	4.1	4.1
Cycle Q Clear(g_c), s	12.0	0.0	0.0	33.6	9.6	35.8	2.9	25.3	1.8	38.3	4.1	4.1
Prop In Lane	0.05		0.27	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	569	0	0	370	582	493	51	1027	458	548	1009	1036
V/C Ratio(X)	0.37	0.00	0.00	0.72	0.31	0.92	0.78	0.74	0.07	0.97	0.19	0.19
Avail Cap(c_a), veh/h	640	0	0	420	662	561	123	1027	458	548	1009	1036
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Uniform Delay (d), s/veh	35.0	0.0	0.0	44.6	34.2	43.2	62.7	41.9	33.5	37.9	7.4	7.4
Incr Delay (d2), s/veh	0.4	0.0	0.0	5.1	0.3	19.0	21.7	4.9	0.3	29.2	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	5.3	0.0	0.0	8.6	4.5	16.5	1.6	11.8	0.8	20.0	1.6	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.4	0.0	0.0	49.7	34.5	62.2	84.4	46.7	33.8	67.1	7.7	7.7
LnGrp LOS	D	A	A	D	C	E	F	D	C	E	A	A
Approach Vol, veh/h		210			900			835			930	
Approach Delay, s/veh		35.4			52.9			48.1			41.8	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	44.0	41.6		44.4	7.8	77.8		44.4
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	40.0	32.0		46.0	9.0	63.0		46.0
Max Q Clear Time (g_c+I1), s	40.3	27.3		14.0	4.9	6.1		37.8
Green Ext Time (p_c), s	0.0	2.2		1.4	0.0	2.6		2.6

Intersection Summary		
HCM 6th Ctrl Delay		46.6
HCM 6th LOS		D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	113	112	85	107	12
Future Volume (Veh/h)	9	113	112	85	107	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	123	122	92	116	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			208			
pX, platoon unblocked						
vC, conflicting volume	214				311	168
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	214				311	168
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				83	99
cM capacity (veh/h)	1356				676	876

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	133	214	129
Volume Left	10	0	116
Volume Right	0	92	13
cSH	1356	1700	692
Volume to Capacity	0.01	0.13	0.19
Queue Length 95th (ft)	1	0	17
Control Delay (s)	0.6	0.0	11.4
Lane LOS	A		B
Approach Delay (s)	0.6	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	0	208	2	2	207
Future Volume (Veh/h)	1	0	208	2	2	207
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	226	2	2	225
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	456	227			228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	456	227			228	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	562	812			1340	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	228	227
Volume Left	1	0	2
Volume Right	0	2	0
cSH	562	1700	1340
Volume to Capacity	0.00	0.13	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	11.4	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX K

PEAK HOUR ARTERIAL ANALYSIS

Arterial Level of Service: EB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jimmy Durante Blvd.	III	30	72.8	43.8	116.6	0.61	18.7	C
Total	III		72.8	43.8	116.6	0.61	18.7	C

Arterial Level of Service: WB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Highway 101	III	30	72.8	27.7	100.5	0.61	21.7	C
Total	III		72.8	27.7	100.5	0.61	21.7	C

Arterial Level of Service: EB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	III	30	72.8	57.7	130.5	0.61	16.7	D
Total	III		72.8	57.7	130.5	0.61	16.7	D

Arterial Level of Service: WB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Highway 101	III	30	72.8	33.5	106.3	0.61	20.5	C
Total	III		72.8	33.5	106.3	0.61	20.5	C

Arterial Level of Service: EB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jimmy Durante Blvd.	III	30	72.8	46.5	119.3	0.61	18.3	C
Total	III		72.8	46.5	119.3	0.61	18.3	C

Arterial Level of Service: WB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Highway 101	III	30	72.8	26.9	99.7	0.61	21.9	C
Total	III		72.8	26.9	99.7	0.61	21.9	C

Arterial Level of Service: EB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	III	30	72.8	59.9	132.7	0.61	16.4	D
Total	III		72.8	59.9	132.7	0.61	16.4	D

Arterial Level of Service: WB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Highway 101	III	30	72.8	33.4	106.2	0.61	20.6	C
Total	III		72.8	33.4	106.2	0.61	20.6	C

Arterial Level of Service: EB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jimmy Durante Blvd.	III	30	72.8	57.0	129.8	0.61	16.8	D
Total	III		72.8	57.0	129.8	0.61	16.8	D

Arterial Level of Service: WB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Highway 101	III	30	72.8	27.4	100.2	0.61	21.8	C
Total	III		72.8	27.4	100.2	0.61	21.8	C

Arterial Level of Service: EB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	III	30	72.8	68.9	141.7	0.61	15.4	D
Total	III		72.8	68.9	141.7	0.61	15.4	D

Arterial Level of Service: WB Via De La Valle

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Highway 101	III	30	72.8	33.2	106.0	0.61	20.6	C
Total	III		72.8	33.2	106.0	0.61	20.6	C