URBAN SYSTEMS ASSOCIATES, INC.
PLANNING & TRAFFIC ENGINEERING, MARKETING & PROJECT SUPPORT
CONSULTANTS TO INDUSTRY AND GOVERNMENT

E-MEMO

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FROM:	*Andrew P. Schlaefli, PE TE*		*TOTAL PAGES:* 14
DATE:	*November 19, 2015*	*TIME: 2:14:18 PM*	*JOB NUMBER: 004115*
SUBJECT:	*Poway Traffic Study*		

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Project Description

As requested, Urban Systems Associates, Inc. (USAI) is providing a traffic study for Habitat for Humanity. The proposed project includes 26 condominium units in the City of Poway.

The project is located on the south side of Twin Peaks Road between Tierra Bonita Road and Espola Road on a 2.15 acre parcel of undeveloped land. **Attachment 1** shows the proposed site plan which includes 26 dwelling units, 25 surface parking spaces, with two access points along Twin Peaks Road. All parking is located on site and there is no street parking available for the proposed site. **Attachment 2** shows the project location.

Project Trip Generation

Trip generation rates were taken from SANDAG's *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, April 2002. According to this document, the proposed project would generate 208 average daily trips (ADT) with 17 AM (3 in/ 14 out) peak hour trips and 21 PM (15 in/ 6 out) PM peak hour trips. **Table 1** shows a vehicle trip generation table that summarizes the driveway rates for the proposed 26 condominiums units.

Although SANDAG trip generation rates are the standard for San Diego County, ITE rates can be used for comparison purposes. ITE Trip Generation Rates (9th edition) were compared to SANDAG rates for this project and found to be 151 ADT compared to the 208 ADT discussed previously. Therefore the SANDAG rates were used for analysis purposes as a conservative approach to account for the highest traffic possibility to be generated by the site. See **Appendix A** for SANDAG and ITE trip generation rates.

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TTM 15-003
DR15-006

Table 1

Project Trip Generation

Land Use	Intensity	Rate	ADT	AM						PM					
				Peak %	Vol.	In %	Out %	In	Out	Peak %	Vol.	In %	Out %	In	Out
Project															
Condominium *	26 DU	8 /DU	208	8%	17	20% :	80%	3	14	10%	21	70% :	30%	15	6

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

Notes:
DU= Dwelling Unit

Attachment 3 shows the project distribution along Twin Peaks Road based on nearby attractions, existing travel patterns, existing traffic volumes, and roadway characteristics. As shown, we estimate about 81% of project traffic (168 ADT) to head west on Twin Peaks Road towards Community Road and I-15. The remaining 19% (40 ADT) is estimated to travel east on Twin Peaks Road toward Espola Road.

Level of Service Thresholds

The SANTEC/ITE Guidelines for the Preparation of Traffic Impact Studies in the San Diego Region, defines a project significant impact at intersections. If an intersection is at Level Of Service (LOS) "E" or "F", then a project would have a significant impact if intersection delay due to the project increases by more than two seconds, or the volume to capacity ratio increases by more than two percent with project traffic added. Intersection operations at LOS "D" are acceptable, so that project impacts to intersections at LOS "D" are less than significant.

Existing Traffic Conditions

According to the City of Poway's General Plan Transportation Master Element, March 2010, Twin Peaks Road is classified as a 4-Lane Major Arterial. From Community Road to Midland, it has a striped median and from Midland Road to Espola, it has two-way-left-turn-lanes (TWLTL). Counts were obtained while local schools were in session in October of 2015 to study the six (6) intersections below:

- Twin Peaks Road at Community Road (signalized)
- Twin Peaks Road at Robert Rio Road (unsignalized)
- Twin Peaks Road at Espola Road (signalized)

Count data (April 2012) was provided by the City of Poway for the three following intersections:

- Twin Peaks Road at Midland Road (signalized)
- Twin Peaks Road at Budwin Lane (signalized)
- Twin Peaks Road at Tierra Bonita Road (signalized)

In addition, two street segments were studied along Twin Peaks Road. One segment was just west of Robert Rio Road, and the other just east of Robert Rio Road.

See **Appendix B** for existing count data. Count data from August of 2015 is also included in **Appendix C** for a "without school traffic" comparison.

Street Segments
Attachment 4 shows the existing average daily traffic volumes on studied street segments. **Attachment 5-A** shows the existing street segment levels of service using the roadway classifications from the SANTEC guidelines. As shown, the studied street segment currently operates at level of service "B".

Intersections
Attachment 5-B shows the existing intersections level of service. As shown, the studied intersections currently operate at acceptable levels of service according to SANDAG/ITE standards with the exception of the following intersection:

- Twin Peaks Road at Community Road in the PM Peak Hour

The average delay and levels of service are shown at all of the intersections analyzed using a software package called *Synchro* which is an application of the Highway Capacity Manual (HCM) methodology. **Appendix D** shows the Existing Synchro worksheets.

Existing with Project Traffic Conditions

Proposed project traffic was added to the existing traffic to determine if any impacts would occur. The summary of the results for the roadway segments and intersections are listed below.

Street Segments
Attachment 6 shows the average daily traffic volumes for the Existing With Project condition. As shown in **Attachment 7-A**, the studied street segments are expected to continue to operate at acceptable levels of service when project traffic was added.

Intersections
Attachment 7-B shows the projected level of service at the studied intersections for the Existing With Project Condition. As shown, the studied intersections are expected to continue to operate at acceptable levels of service when project traffic was added with the exception of the following intersection:

- Twin Peaks Road at Community Road in the PM Peak Hour

Appendix E shows the Existing With Project Synchro worksheets.

Queuing Analysis

As requested, a queuing analysis was performed for the eastbound direction at the intersection of Twin Peaks Road and Espola Road. Traffic counts showed peak hour at this intersection started at 7:00 AM and 4:30 PM. A field check of the AM peak hour traffic patterns was performed on Tuesday November 3rd as well as Wednesday November 4th, 2015 for the PM peak hour traffic patterns.

Based on these observations, minimal queuing occurred at the intersection of Twin Peaks Road and Espola Road during both the AM and PM peak hours observed. However, additional queuing was observed on westbound Twin Peaks Road to northbound Tierra Bonita Road during the AM peak hour. This queue lasted approximately 20-30 minutes and can be attributed to student drop off for Twin Peaks Middle School.

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According to the school's website, classes start at 8:30 AM. Based on field observations, the queuing on Twin Peaks Road dissipated by approximately 7:45 AM.

A theoretical queuing analysis for both of these intersections was conducted using *Synchro,* see **Appendix F.** The following results summarize the queues along Twin Peaks Road between Tierra Bonita Road and Espola Road. The purpose in this queuing analysis is to determine if with queues along Twin Peaks Road would interfere with the project access.

Existing Queuing:

Twin Peaks Road at Tierra Bonita Road

- The 95th percentile queue for the westbound through movement on Twin Peaks Road is expected to be 610 feet in the AM and 331 for the PM. Robert Rio Road is approximately 600 feet east of Tierra Bonita Road.

Twin Peaks Road at Espola Road

- The 95th percentile queue for the eastbound left turn lane is expected to be 211 feet in the AM and 287 in the PM. The turn bay length is approximately 200 feet. However, there is an additional 150 feet within the two-way-left-turn-lane for additional storage. Based on the results of the queuing analysis, vehicles on Twin Peaks Road would not be expected to block the eastern driveway of the project access.

Existing With Project:

Twin Peaks Road at Tierra Bonita Road

- The 95th percentile queue for the westbound through movement on Twin Peaks Road is expected to be 685 feet in the AM and 337 for the PM. Robert Rio Road is approximately 600 feet west of Tierra Bonita Road.

Twin Peaks Road at Espola Road

- The 95th percentile queue for the eastbound left turn lane on Twin Peaks is expected to be 212 feet in the AM and 289 in the PM. The turn bay length is approximately 200 feet. However, there is an additional 150 feet within the two-way-left-turn-lane for additional storage. Based on the results of the queuing analysis, vehicles on Twin Peaks Road would not be expected to block the eastern driveway of the project access.

In summary, queuing occurs on westbound Twin Peaks Road during the AM peak hour, however it is not expected to interfere with the western driveway of the project. Queuing also occurs on eastbound Twin Peaks Road at Espola Road during the PM peak hour, however it is not expected to interfere with the eastern driveway of the project. These queues, however, are not expected to affect project access due to the minimal volumes this project would generate (17 AM peak hour trips and 21 PM peak hour trips).

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Site Access Analysis

Urban Systems also evaluated the project access and on-site circulation. Careful consideration was used when looking at the project access with relation to several major factors: 1) the relationship of the project access and the corner access for the adjacent property to the West (*The Connection Church*), 2) the relationship of the westbound left turn lane to the adjacent property and project driveways and 3) the relationship of access to the intersection of Twin Peaks and Robert Rio Road.

The proposed design assumes two-way circulation as is shown on project site plan, and can be seen in **Attachment 8**, allows entry and exiting at both driveways. This design is estimated to split the project traffic 50/50 west and east with those residents on the eastern half of the property generally utilizing the eastern driveway, and those living on the west half of the property generally utilizing the western driveway. As discussed previously, queuing along Twin Peaks Road is not expected to interfere with either project driveway.

Conclusion

Attachment 9 shows the level of service comparison between the Existing and Existing With Project Conditions for both the studied street segments and the studied intersections. As shown in the summary tables, the proposed project would not result in any direct significant impacts on studied street segments or intersections. Although the intersection of Twin Peaks Road at Community Road operates at LOS E in the PM peak hour for the Existing and Existing With Project conditions, because the change in delay is less than two seconds it is not considered a significant impact. Therefore, no roadway or intersection improvements would be needed with the implementation of this project.

Appendix A SANDAG and ITE Trip Generation Rates
Appendix B includes Existing Traffic Count Data with School (October 2015)
Appendix C includes Existing Traffic Count Data without School (August 2015)
Appendix D includes Existing Synchro Worksheets
Appendix E includes Existing With Project Synchro Worksheets
Appendix F includes Queuing Synchro Worksheets

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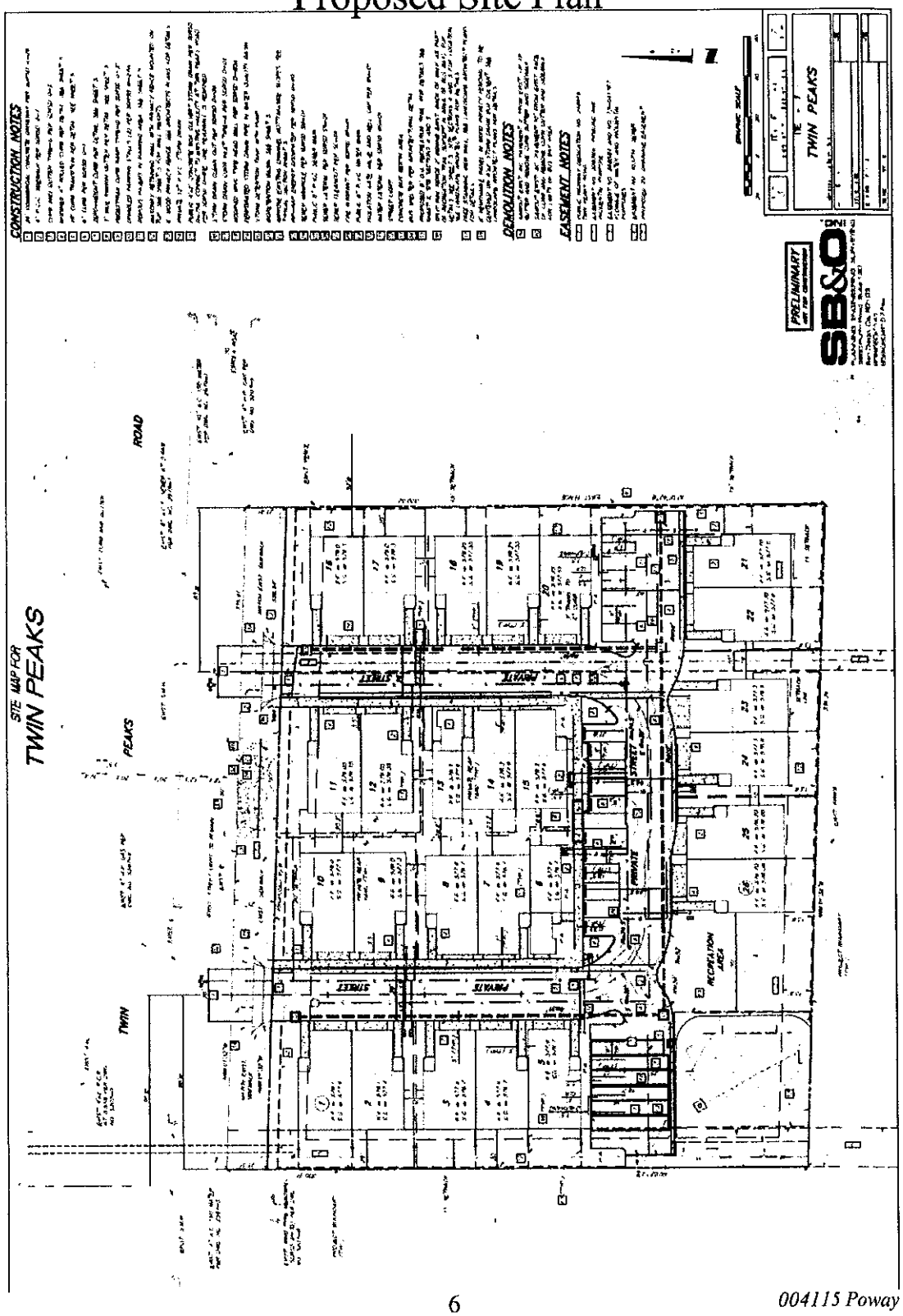
Attachment 1

Proposed Site Plan



Attachment 2
Project Location

Legend

= Project Location

= Studied Intersection Location

X = Studied Street Segment

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Attachment 3
Project Distribution

Legend

= Project Location

XX% =Distribution Percentage

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Attachment 4
Existing Average Daily Traffic Volumes

Legend

= Project Location

XX,XXX = ADT Number

N
NO SCALE

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Attachment 5

A) Existing Street Segment Levels of Service

Road	Segment	Standard	Class.	Cap.	Volume	V/C	LOS*
Twin Peaks Rd.	West of Robert Rio Road	Poway GP	4-M	43,000	19,333	0.45	B
	East of Robert Rio Road	Poway GP	4-M	43,000	19,407	0.45	B

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

4-M = 4 Lane Major Arterial

Notes:

Count Date: August 2015

*LOS determined via SANTEC / ITE guidelines for a 4 Lane Major Arterial, March 2000

B) Existing Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Twin Peaks Rd. / Community Rd.	Signalized	41.7	D	73.6	[illegible]
2	Twin Peaks Rd. / Midland Road	Signalized	36.6	D	53.8	D
3	Twin Peaks Rd. / Budwin Lane	Signalized	7.0	A	8.7	A
4	Twin Peaks Rd. / Tierra Bonita Rd.	Signalized	40.7	D	27.1	C
5	Twin Peaks Rd. / Robert Rio Rd.	Unsignalized	14.1	B	15.6	C
6	Twin Peaks Rd. / Espola Rd.	Signalized	34.1	C	30.6	C

Notes:

LOS = Level of Service

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Attachment 6
Existing With Project Average Daily Traffic Volumes

Legend

= Project Location

XX,XXX = ADT Number

NO SCALE

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Attachment 7

A) Existing With Project Street Segment Levels of Service

Road	Segment	Standard	Class.	Cap.	Volume	V/C	LOS
Twin Peaks Rd.	West of Robert Rio Road	Poway GP	4-M	43,000	19,501	0.45	B
	East of Robert Rio Road	Poway GP	4-M	43,000	19,447	0.45	B

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

4-M = 4 Lane Major Arterial

Notes:

Count Date: August 2015

*LOS determined via SANTEC / ITE guidelines for a 4 Lane Major Arterial, March 2000

B) Existing With Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Twin Peaks Rd. / Community Rd.	Signalized	41.8	D	74.9	[illegible]
2	Twin Peaks Rd. / Midland Road	Signalized	36.7	D	53.9	D
3	Twin Peaks Rd. / Budwin Lane	Signalized	7.1	A	8.7	A
4	Twin Peaks Rd. / Tierra Bonita Rd.	Signalized	40.7	D	27.2	C
5	Twin Peaks Rd. / Robert Rio Rd.	Unsignalized	14.2	B	15.7	C
6	Twin Peaks Rd. / Espola Rd.	Signalized	34.1	C	30.6	C

Notes:

LOS = Level of Service

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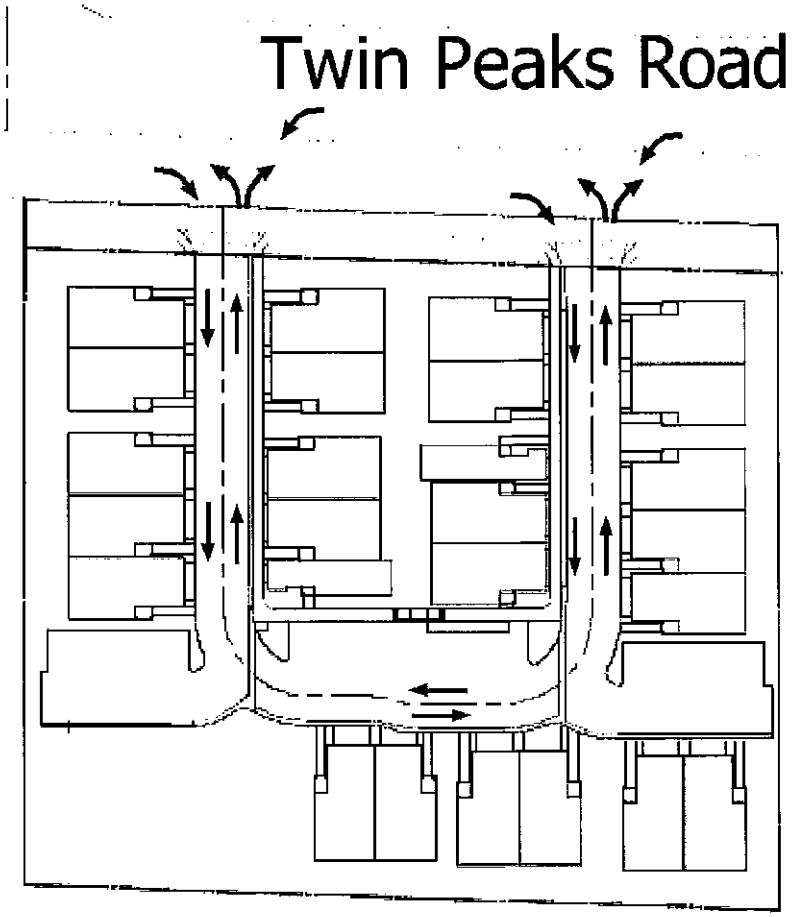
Attachment 8
Project Access

Two-Way Circulation



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Attachment 9

A) Street Segment Level of Service Comparison

Road	Segment	Class.	Capacity	Existing			Existing + Project			ΔV/C	Is this impact Significant?
				LOS	Volume	V/C	LOS	Volume	V/C		
Twin Peaks Road	West of Robert Rio Road	4-M	43,000	B	19,333	0.45	B	19,501	0.45	0.004	***NO***
	East of Robert Rio Road	4-M	43,000	B	19,407	0.45	B	19,447	0.45	0.001	***NO***

Legend:

LOS= Level of Service

V/C= Volume to Capacity Ratio

ΔV/C= Change in V/C ratio

B) Intersection Level of Service 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	Twin Peaks Rd. / Community Rd.	41.7	D	73.6	E	41.8	D	0.1	No	74.9	E	1.3	No
2	Twin Peaks Rd. / Midland Road	36.6	D	53.8	D	36.7	D	0.1	No	53.9	D	0.1	No
3	Twin Peaks Rd. / Budwin Lane	7.0	A	8.7	A	7.1	A	0.1	No	8.7	A	0.0	No
4	Twin Peaks Rd. / Tierra Bonita Rd.	40.7	D	27.1	C	40.7	D	0.0	No	27.2	C	0.1	No
5	Twin Peaks Rd. / Robert Rio Rd.	14.1	B	15.6	C	14.2	B	0.1	No	15.7	C	0.1	No
6	Twin Peaks Rd. / Espola Rd.	34.1	C	30.6	C	34.1	C	0.0	No	30.6	C	0.0	No

Notes:

LOS = Level of Service

Δ = Change

S = Significant

D= Delay

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Appendix A

SANDAG and ITE Trip Generation Rates

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SANDAG Trip Generation Rates

Land Use	Intensity	Rate	ADT	AM						PM					
				Peak %	Vol.	In %	Out %	In	Out	Peak %	Vol.	In %	Out %	In	Out
Project															
Condominium *	26 DU	8 /DU	208	8%	17	20% :	80%	3	14	10%	21	70% :	30%	15	6

Sources

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

Notes:

DU= Dwelling Unit

ITE Trip Generation Rates

Land Use	Intensity	Rate	ADT	AM						PM					
				Peak %	Vol.	In %	Out %	In	Out	Peak %	Vol.	In %	Out %	In	Out
Project															
Condominium **	26 DU	8 /DU	208	8%	17	20% :	80%	3	14	10%	21	70% :	30%	15	6

Sources

**Rates are used taken from ITE Trip Generation #th edition

Notes:

DU= Dwelling Unit

(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) 699-1900 • Fax (619) 699-1950

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 nationall 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 6:00-9:30 A.M.		Between 3:00-6:30 P.M.		TRIP LENGTH (Miles)[b]
AGRICULTURE (Open Space)	(80:18:2)	2/acre**					10.8
AIRPORT	(78:20:2)						12.5
Commercial		60/acre, 100/flight, 70/1000 sq. ft.* **	8%	(6:4)	9%	(6:5)	
General Aviation		6/acre, 2/flight, 6/based aircraft* **	9%	(7:3)	15%	(5:5)	
Heliports		100/acre**					
AUTOMOBILE[d]							
Car Wash							
Automatic		900/site, 600/acre**	4%	(5:5)	9%	(5:5)	
Self-serve		100/washstall**	4%	(5:5)	8%	(5:5)	
Gasoline	(21:51:28)						2.8
with/Food Mart		180/vehicle fueling space**	7%	(5:5)	8%	(5:5)	
with/Food Mart & Car Wash		156/vehicle fueling space**	8%	(5:5)	9%	(5:5)	
Older Service Station Design		160/vehicle fueling space, 900/station**	7%	(5:5)	9%	(5:5)	
Sales (Dealer & Repair)		50/1000 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)	(84:25:11)	9/1000 sq. ft., 30/acre** (quadruple rates for Sunday, or days of assembly)	5%	(6:4)	8%	(5:5)	5.1
COMMERCIAL/RETAIL[i]							
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)	(54:35:11)	50/1000 sq. ft.,[c] 500/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)	80/1000 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)						
Specialty Retail/Strip Commercial		40/1000 sq. ft., 400/acre*	3%	(6:4)	9%	(5:5)	4.3
Electronics Superstore		50/1000 sq. ft**			10%	(5:5)	
Factory Outlet		40/1000 sq. ft.**	3%	(7:3)	9%	(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 (15-16 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		60/1000 sq. ft., 600/acre* **	1%	(7:3)	9%	(5:5)	
Discount Store		60/1000 sq. ft., 600/acre**	3%	(6:4)	8%	(5:5)	
Furniture Store		6/1000 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.**	9%	(6:4)	8%	(5:5)	
Hardware/Paint Store		60/1000 sq. ft., 600/acre**	2%	(5:4)	9%	(5:5)	
Garden Nursery		40/1000 sq. ft., 90/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)	3% 9%	(6:4) (3:7)	9% 13%	(5:5) (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)	9.0
High School	(75:19:6)	1.3/student, 15/1000 sq. ft., 60/acre* **	20%	(7:3)	10%	(4:6)	4.8
Middle/Junior High	(63:25:12)	1.4/student, 12/1000 sq. ft. 50/acre**	30%	(8:4)	9%	(4:6)	6.0
Elementary	(57:25:10)	1.6/student, 14/1000 sq. ft., 90/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[j]	(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., 1600/acre*	8%	(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., 600/acre**	2%		9%		
Drive-Through only		100 (50 one-way)/lane**	4%		15%		
HOSPITAL	(73:25:2)						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)	8.0
Industrial Park (no commercial)		6/1000 sq. ft., 90/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., 80/acre**	13%	(7:3)	15%	(4:6)	
Storage		2/1000 sq. ft., 0.2/vault, 30/acre*	6%	(5:5)	9%	(5:5)	
Science Research & Development		8/1000 sq. ft., 80/acre*	16%	(8:1)	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 6:00-9:30 A.M.		Between 3:00-6:30 P.M.		TRIP LENGTH (Miles)[b]
LIBRARY	[44:44:12]	50/1000 sq. ft., 400/acre**	2%	(7:3)	10%	(5:5)	3.9
LODGING	[58:38:4]						7.6
Hotel (w/convention facilities/restaurant)		10/occupied room, 300/acre	8%	(6:4)	8%	(6:4)	
Motel		9/occupied room, 200/acre*	8%	(4:6)	9%	(6:4)	
Resort Hotel		8/occupied room, 100/acre*	8%	(6:4)	7%	(4:6)	
Business Hotel		7/occupied room**	8%	(4:6)	9%	(6:4)	
MILITARY	[82:16:2]	2.6/military & civilian personnel*	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.,[c] 300/acre*	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.,[c] 800/acre*	13%	(9:1)	14%	(2:8)	10.0
Office Park (400,000+ sq. ft.)		12/1000 sq.ft., 200/acre* **	13%	(9:1)	13%	(2:8)	
Single Tenant Office		14/1000 sq. ft., 180/acre*	15%	(9:1)	15%	(2:8)	8.8
Corporate Headquarters		7/1000 sq. ft., 110/acre*	17%	(9:1)	16%	(1:9)	
Government (Civic Center)	[50:34:16]	30/1000 sq. ft.**	9%	(9:1)	12%	(3:7)	6.0
Post Office							
Central/Walk-in Only		90/1000 sq. ft.**	5%		7%		
Community (not including mail drop lane)		200/1000 sq. ft., 1300/acre*	6%	(6:4)	8%	(5:5)	
Community (w/mail drop lane)		300/1000 sq. ft., 2000/acre*	7%	(5:5)	10%	(5:5)	
Mail Drop Lane only		1500 (750 one-way)/lane*	7%	(5:5)	12%	(5:5)	
Department of Motor Vehicles		180/1000 sq. ft., 900/acre**	6%	(6:4)	10%	(4:6)	
Medical-Dental	[60:30:10]	50/1000 sq. ft., 600/acre*	6%	(6:2)	11%	(3:7)	6.4
PARKS	[66:28:6]		4%		8%		5.4
City (developed w/meeting rooms and sports facilities)		50/acre*	13%	(8:5)	9%	(5:5)	
Regional (developed)		20/acre*					
Neighborhood/County (undeveloped)		5/acre (add for specific sport uses), 8/picnic site* **					
State (average 1000 acres)		1/acre, 10/picnic site**					
Amusement (Theme)		80/acre, 130/acre (summer only)**			6%	(6:4)	
San Diego Zoo		115/acre*					
Sea World		60/acre*					
RECREATION							
Beach, Ocean or Bay	[52:39:9]	600/1000 ft. shoreline, 60/acre*					6.3
Beach, Lake (fresh water)		50/1000 ft. shoreline, 5/acre*					
Bowling Center		30/1000 sq. ft., 300/acre, 30/lane**	7%	(7:3)	11%	(4:6)	
Campground		4/campsite**	4%		8%		
Golf Course		7/acre, 40/hole, 700/course* **	7%	(8:2)	9%	(3:7)	
Driving Range only		70/acre, 14/tee box*	3%	(7:3)	9%	(5:5)	
Marinas		4/berth, 20/acre* **	3%	(3:7)	7%	(6:4)	
Multi-purpose (miniature golf, video arcade, batting cage, etc.)		90/acre	2%		6%		
Racquetball/Health Club		30/1000 sq. ft., 300/acre, 40/court*	4%	(8:4)	9%	(0:4)	
Tennis Courts		16/acre, 30/court**	5%		11%	(6:5)	
Sports Facilities							
Outdoor Stadium		50/acre, 0.2/seat*					
Indoor Arena		30/acre, 0.1/seat*					
Racetrack		40/acre, 0.6 seat*					
Theaters (multiplex w/matinee)	[66:17:17]	80/1000 sq. ft., 1.8/seat, 360/screen*	10%		8%	(6:4)	6.1
RESIDENTIAL	[86:11:3]						7.9
Estate, Urban or Rural (average 1-2 DU/acre)		12/dwelling unit*[h]	8%	(3:7)	10%	(7:3)	
Single Family Detached (average 3-8 DU/acre)		10/dwelling unit*[h]	8%	(3:7)	10%	(7:3)	
Condominium (or any multi-family 6-20 DU/acre)		8/dwelling unit*[h]	8%	(2:8)	10%	(7:3)	
Apartment (or any multi-family units more than 20 DU/acre)		6/dwelling unit*[h]	8%	(2:8)	9%	(7:3)	
Military Housing (off-base, multi-family)							
(less than 8 DU/acre)		8/dwelling unit	7%	(3:7)	9%	(6:4)	
(8-20 DU/acre)		6/dwelling unit	7%	(3:7)	9%	(6:4)	
Mobile Home							
Family		5/dwelling unit, 40/acre*	8%	(3:7)	11%	(6:4)	
Adults Only		3/dwelling unit, 20/acre*	9%	(3:7)	10%	(6:4)	
Retirement Community		4/dwelling unit**	8%	(4:6)	7%	(6:4)	
Congregate Care Facility		2.5/dwelling unit**	4%	(6:4)	8%	(5:5)	
RESTAURANT[g]	[61:37:12]						4.7
Quality		100/1000 sq. ft., 3/seat, 500/acre**	8%	(6:4)	8%	(7:3)	
Sit-down, high turnover		160/1000 sq. ft., 8/seat, 1000/acre**	8%	(6:5)	8%	(6:4)	
Fast Food (w/drive-through)		650/1000 sq. ft., 20/seat, 3000/acre**	7%	(5:5)	7%	(6:5)	
Fast Food (without drive-through)		700/1000 sq. ft.**	8%	(6:4)	7%	(6:5)	
Delicatessen (7am-4pm)		160/1000 sq. ft., 11/seat*	9%	(6:4)	3%	(3:7)	
TRANSPORTATION							
Bus Depot		25/1000 sq. ft.**					
Truck Terminal		10/1000 sq. ft., 7/bay, 80/acre**	9%	(4:6)	9%	(5:5)	
Waterport/Marine Terminal		170/berth, 12/acre**					
Transit Station (Light Rail w/parking)		300/acre, 2[1/2]/parking space (4/occupied)**	14%	(7:3)	15%	(3:7)	
Park & Ride Lots		400/acre (600/paved acre), 5/parking space (8/occupied)**	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 = 6.9 miles)

[e] Fitted curve equation: $Ln(T) = 0.502\ Ln(x) + 6.945$ } T = total trips, x = 1,000 sq. ft.

[f] Fitted curve equation: $Ln(T) = 0.756\ Ln(x) + 3.950$ }

[h] Fitted curve equation: $t = -2.169\ Ln(d) + 12.85$ t = trips/DU, d = density (DU/acre), DU = dwelling unit

[i] 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/reviews and Other sources**):

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

[j] 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).

Land Use: 230
Residential Condominium/Townhouse

Description

Residential condominiums/townhouses are defined as ownership units that have at least one other owned unit within the same building structure. **Both condominiums and townhouses are included in this land use.** The studies in this land use did not identify whether the condominiums/townhouses were low-rise or high-rise. Low-rise residential condominium/townhouse (Land Use 231), high-rise residential condominium/townhouse (Land Use 232) and luxury condominium/townhouse (Land Use 233) are related uses.

Additional Data

The number of vehicles and the number of residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it is usually readily available, easy to project and had a high correlation with average weekday vehicle trip ends.

The peak hour of the generator typically coincided with the peak hour of the adjacent street traffic.

The sites were surveyed between the mid-1970s and the 2000s throughout the United States and Canada.

Source Numbers

4, 92, 94, 95, 97, 100, 105, 106, 114, 168, 186, 204, 237, 253, 293, 319, 320, 321, 390, 412, 418, 561, 562, 583, 638

Residential Condominium/Townhouse
(230)

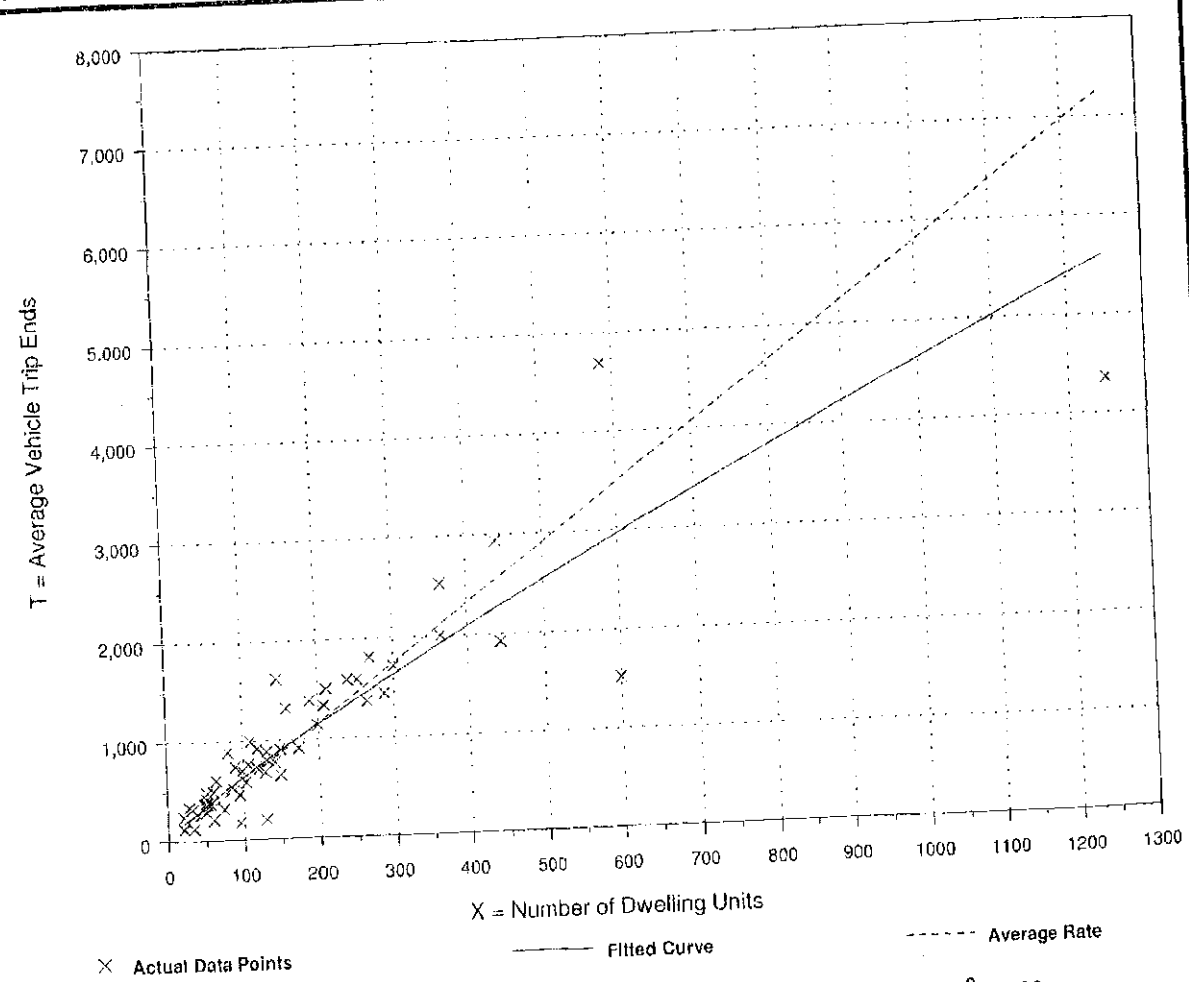
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Number of Studies: 56
Avg. Number of Dwelling Units: 179
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.81	1.53 - 11.79	3.11

Data Plot and Equation



$R^2 = 0.80$

Fitted Curve Equation: $Ln(T) = 0.87\ Ln(X) + 2.46$

Appendix B

Existing Traffic Counts with School (October 2015)

8451 Miralani Dr., Suite A • San Diego, CA 92126 • (858) 560-4911 • Fax (858) 560-9734

THURSDAY - OCTOBER 29, 2015 CITY: POWAY PROJECT: PTD15-1030-03

TWIN PEAKS - E/O ROBERTO RIO

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			10		3			12:00			143		146		
00:15			10		3			12:15			140		121		
00:30			13		7			12:30			113		117		
00:45			6	39	2	15	54	12:45			145	541	106	490	1031
01:00			2		5			13:00			136		116		
01:15			1		2			13:15			141		105		
01:30			2		5			13:30			125		141		
01:45			0	5	3	15	20	13:45			174	576	107	469	1045
02:00			4		0			14:00			191		141		
02:15			2		2			14:15			217		253		
02:30			1		4			14:30			199		177		
02:45			1	8	3	9	17	14:45			234	841	185	756	1597
03:00			5		3			15:00			197		165		
03:15			1		1			15:15			260		165		
03:30			1		6			15:30			245		169		
03:45			3	10	6	16	26	15:45			244	946	157	656	1602
04:00			4		8			16:00			231		151		
04:15			1		7			16:15			250		160		
04:30			5		19			16:30			228		128		
04:45			7	17	33	67	84	16:45			265	974	166	605	1579
05:00			8		38			17:00			269		154		
05:15			12		56			17:15			221		131		
05:30			23		97			17:30			240		140		
05:45			35	78	111	302	380	17:45			221	951	119	544	1495
06:00			47		115			18:00			264		132		
06:15			84		140			18:15			225		144		
06:30			92		212			18:30			193		134		
06:45			184	407	250	717	1124	18:45			196	878	102	512	1390
07:00			169		268			19:00			149		77		
07:15			128		315			19:15			184		65		
07:30			115		270			19:30			165		91		
07:45			90	502	223	1076	1578	19:45			133	631	65	298	929
08:00			121		218			20:00			101		68		
08:15			135		220			20:15			95		39		
08:30			108		191			20:30			91		43		
08:45			101	465	202	831	1296	20:45			99	386	26	176	562
09:00			83		145			21:00			96		85		
09:15			101		140			21:15			65		65		
09:30			105		131			21:30			69		34		
09:45			84	373	123	539	912	21:45			49	279	21	205	484
10:00			99		130			22:00			31		17		
10:15			79		140			22:15			36		16		
10:30			93		142			22:30			34		13		
10:45			124	395	130	542	937	22:45			23	124	14	60	184
11:00			94		96			23:00			27		12		
11:15			128		141			23:15			18		9		
11:30			139		119			23:30			13		8		
11:45			136	497	116	472	969	23:45			17	75	8	37	112
Total Vol.				2796		4601	**7397**					7202		4808	**12010**

Daily Totals

	NB	SB	EB	WB	Combined
			9998	9409	**19407**
	AM		**PM**		
Split %	37.8%	62.2%	**38.1%**	60.0%	40.0%	**61.9%**
Peak Hour	06:45	06:45	**06:45**	16:15	14:15	**14:15**
Volume	596	1103	**1699**	1012	780	**1627**
P.H.F.	0.81	0.88	**0.96**	0.94	0.77	**0.87**

THURSDAY - OCTOBER 29, 2015 CITY: POWAY PROJECT: PTD15-1030-03

TWIN PEAKS - W/O ROBERTO RIO

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			11		3			12:00			135		143		
00:15			10		4			12:15			127		120		
00:30			13		4			12:30			104		122		
00:45			6	40	5	16	56	12:45			138	504	116	501	1005
01:00			2		3			13:00			129		120		
01:15			1		4			13:15			124		111		
01:30			2		5			13:30			113		125		
01:45			0	5	3	15	20	13:45			167	533	125	481	1014
02:00			5		0			14:00			175		127		
02:15			2		1			14:15			211		246		
02:30			1		3			14:30			188		178		
02:45			1	9	3	7	16	14:45			222	796	205	756	1552
03:00			5		5			15:00			196		144		
03:15			1		1			15:15			244		106		
03:30			1		4			15:30			229		166		
03:45			2	9	8	18	27	15:45			223	892	169	585	1477
04:00			4		7			16:00			248		151		
04:15			2		9			16:15			240		166		
04:30			5		20			16:30			235		131		
04:45			5	16	32	68	84	16:45			251	974	156	604	1578
05:00			9		35			17:00			288		168		
05:15			10		49			17:15			231		140		
05:30			21		95			17:30			262		144		
05:45			30	70	116	295	365	17:45			218	999	135	587	1586
06:00			45		123			18:00			252		141		
06:15			79		130			18:15			219		149		
06:30			85		204			18:30			186		137		
06:45			182	391	235	692	1083	18:45			194	851	111	538	1389
07:00			180		259			19:00			149		82		
07:15			121		318			19:15			182		73		
07:30			108		288			19:30			163		91		
07:45			99	508	222	1087	1595	19:45			128	622	67	313	935
08:00			121		229			20:00			105		75		
08:15			145		235			20:15			97		41		
08:30			116		205			20:30			96		38		
08:45			101	483	201	870	1353	20:45			98	396	41	195	591
09:00			81		170			21:00			99		65		
09:15			100		149			21:15			63		84		
09:30			106		137			21:30			72		33		
09:45			81	368	120	576	944	21:45			48	282	26	208	490
10:00			93		134			22:00			33		19		
10:15			74		149			22:15			40		18		
10:30			88		135			22:30			34		15		
10:45			109	364	135	553	917	22:45			24	131	10	62	193
11:00			92		107			23:00			28		12		
11:15			111		143			23:15			18		12		
11:30			127		118			23:30			13		9		
11:45			124	454	126	494	948	23:45			17	76	6	39	115
Total Vol.				2717		4691	**7408**					7056		4869	**11925**

Daily Totals

NB	SB	EB	WB	**Combined**
		9773	9560	**19333**

	AM			**PM**		
Split %	36.7%	63.3%	**38.3%**	59.2%	40.8%	**61.7%**
Peak Hour	06:45	06:45	**06:45**	16:45	14:15	**16:45**
Volume	591	1100	**1691**	1032	773	**1640**
P.H.F.	0.81	0.86	**0.96**	0.90	0.79	**0.90**

INTERSECTION TURNING MOVEMENT COUNTS

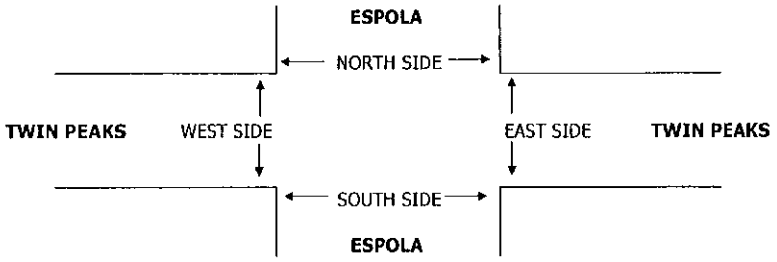
PREPARED BY: PACIFIC TECHNICAL DATA

DATE:	LOCATION:	POWAY	PROJECT #:	PDT15-1030-03
10/29/15	NORTH & SOUTH:	ESPOLA	LOCATION #:	3
THURSDAY	EAST & WEST:	TWIN PEAKS	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

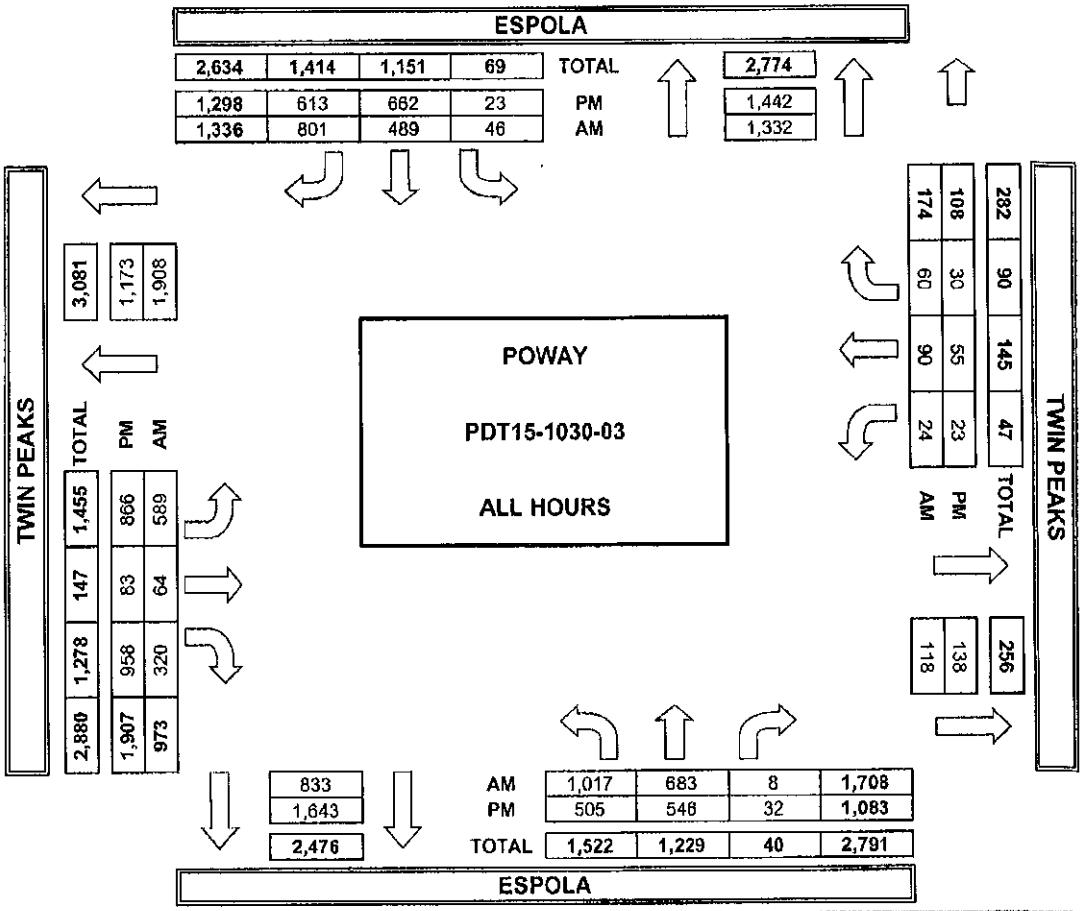
		NORTHBOUND ESPOLA			SOUTHBOUND ESPOLA			EASTBOUND TWIN PEAKS			WESTBOUND TWIN PEAKS				U-TURNS				
	LANES:	NL 2	NT 1	NR 1	SL 1	ST 1	SR 1	EL 2	ET 1	ER 1	WL 1	WT 1	WR 0	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	85	131	0	2	58	158	130	8	28	4	13	18	635					0
	7:15 AM	140	87	3	4	68	161	86	11	39	1	12	7	619					0
	7:30 AM	132	80	0	10	88	100	54	5	42	1	10	8	530					0
	7:45 AM	138	77	1	5	65	91	51	9	50	3	18	5	513					0
	8:00 AM	135	73	0	6	43	82	64	6	52	3	9	4	477					0
	8:15 AM	148	74	2	6	61	69	77	12	44	2	10	7	512					0
	8:30 AM	121	84	0	5	55	77	68	8	33	6	9	5	471					0
	8:45 AM	118	77	2	8	51	63	59	5	32	4	9	6	434					0
	VOLUMES	1,017	683	8	46	489	801	589	64	320	24	90	60	4,191	0	0	0	0	0
	APPROACH %	60%	40%	0%	3%	37%	60%	61%	7%	33%	14%	52%	34%						
	APP/DEPART	1,708	/	1,332	1,336	/	833	973	/	118	174	/	1,908	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	495	375	4	21	279	510	321	33	159	9	53	38	2,297					
	APPROACH %	57%	43%	0%	3%	34%	63%	63%	6%	31%	9%	53%	38%						
	PEAK HR FACTOR		0.950			0.869			0.773			0.714		0.904					
	APP/DEPART	874	/	734	810	/	447	513	/	58	100	/	1,058	0					
PM	4:00 PM	69	71	3	2	70	78	108	8	118	3	8	2	540					0
	4:15 PM	52	77	4	2	72	90	109	9	126	1	9	2	553					0
	4:30 PM	58	81	4	4	94	81	121	12	105	2	11	6	579					0
	4:45 PM	77	70	6	2	103	74	116	8	126	6	6	5	599					0
	5:00 PM	64	60	4	2	88	73	102	14	137	3	4	4	555					0
	5:15 PM	65	66	6	4	81	82	115	15	109	2	8	4	557					0
	5:30 PM	61	58	3	5	70	70	94	8	123	4	5	3	504					0
	5:45 PM	59	63	2	2	84	65	101	9	114	2	4	4	509					0
	VOLUMES	505	546	32	23	662	613	866	83	958	23	55	30	4,396	0	0	0	0	0
	APPROACH %	47%	50%	3%	2%	51%	47%	45%	4%	50%	21%	51%	28%						
	APP/DEPART	1,083	/	1,442	1,298	/	1,643	1,907	/	138	108	/	1,173	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	264	277	20	12	366	310	454	49	477	13	29	19	2,290					
	APPROACH %	47%	49%	4%	2%	53%	45%	46%	5%	49%	21%	48%	31%						
	PEAK HR FACTOR		0.917			0.961			0.968			0.803		0.956					
	APP/DEPART	561	/	750	688	/	856	980	/	81	61	/	603	0					

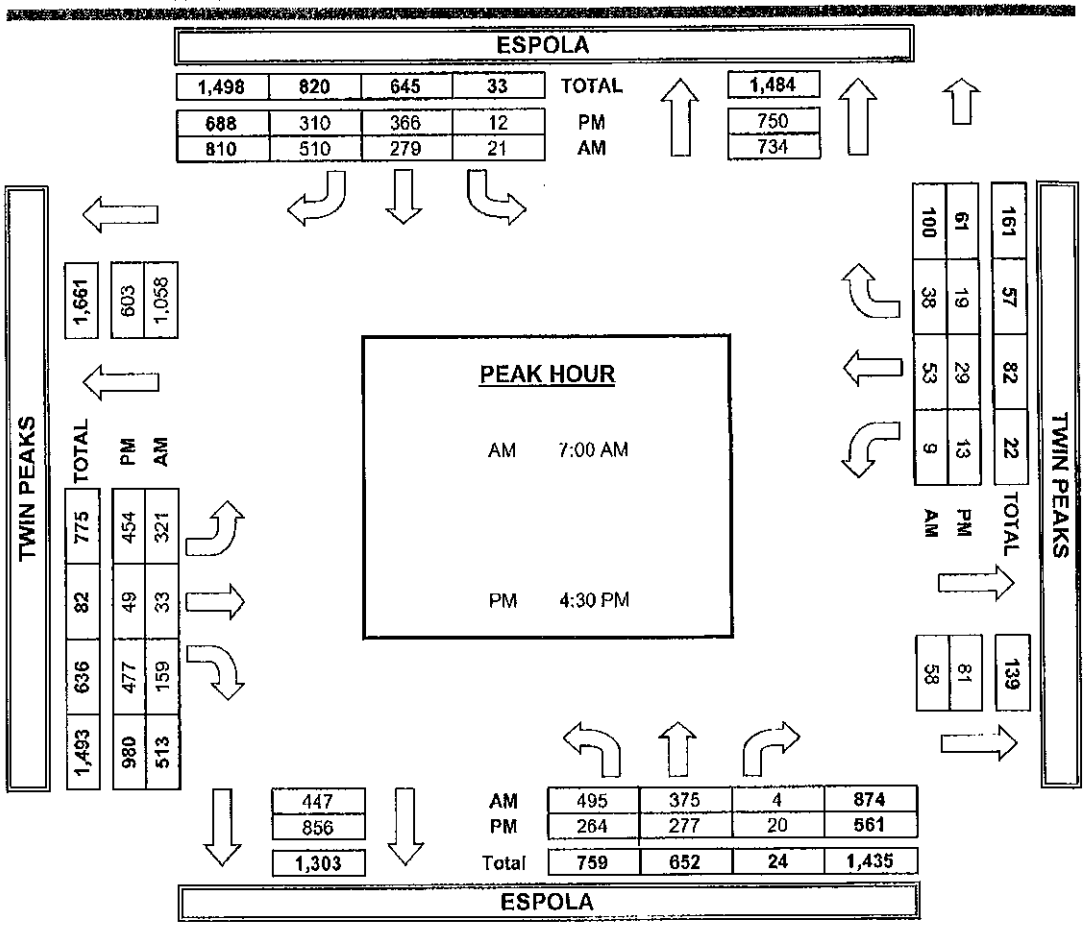


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

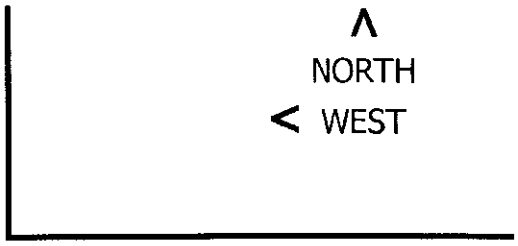
PACIFIC TECHNICAL DATA

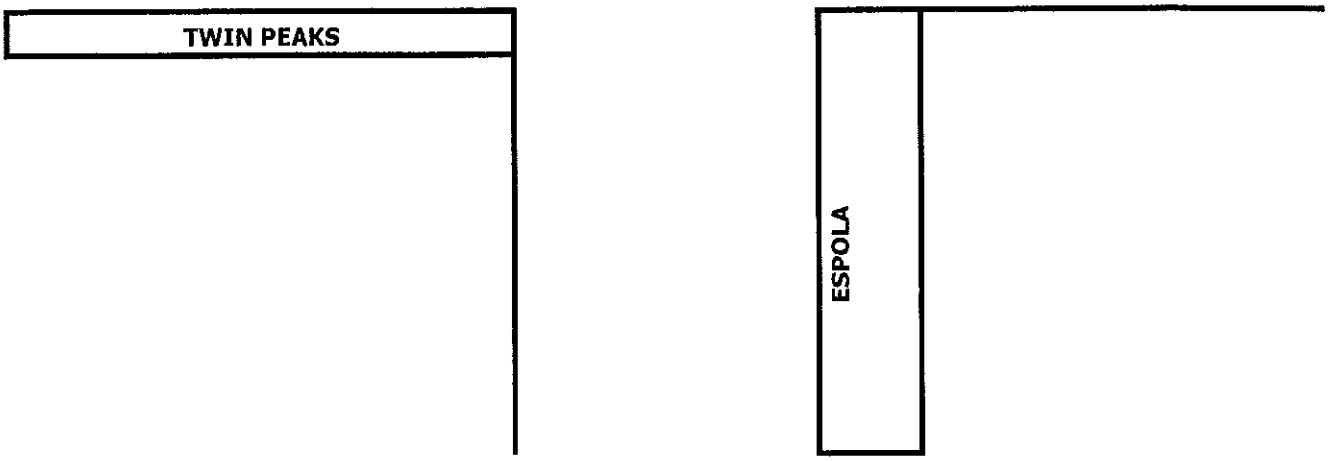
TURNING MOVEMENT COUNTS





CAM	LOCATION
	03





NORTH/SOUTH STREET	ESPOLA
EAST/WEST STREET	TWIN PEAKS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
0700												
1600												

INTERSECTION TURNING MOVEMENT COUNTS

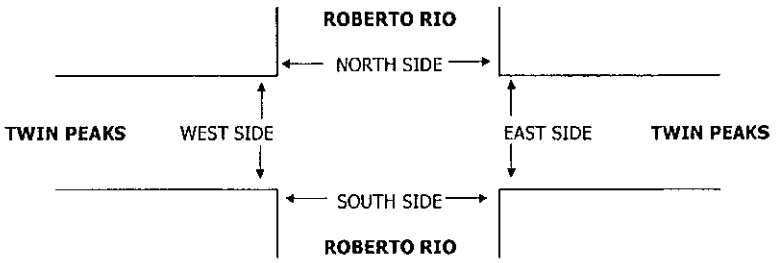
PREPARED BY: PACIFIC TECHNICAL DATA

DATE:	LOCATION:	POWAY	PROJECT #:	PDT15-1030-03
10/29/15	NORTH & SOUTH:	ROBERTO RIO	LOCATION #:	2
THURSDAY	EAST & WEST:	TWIN PEAKS	CONTROL:	STOP

NOTES:

AM / PM / MID / OTHER / OTHER — ◄ W — ▲ N — S ▼ — E ►

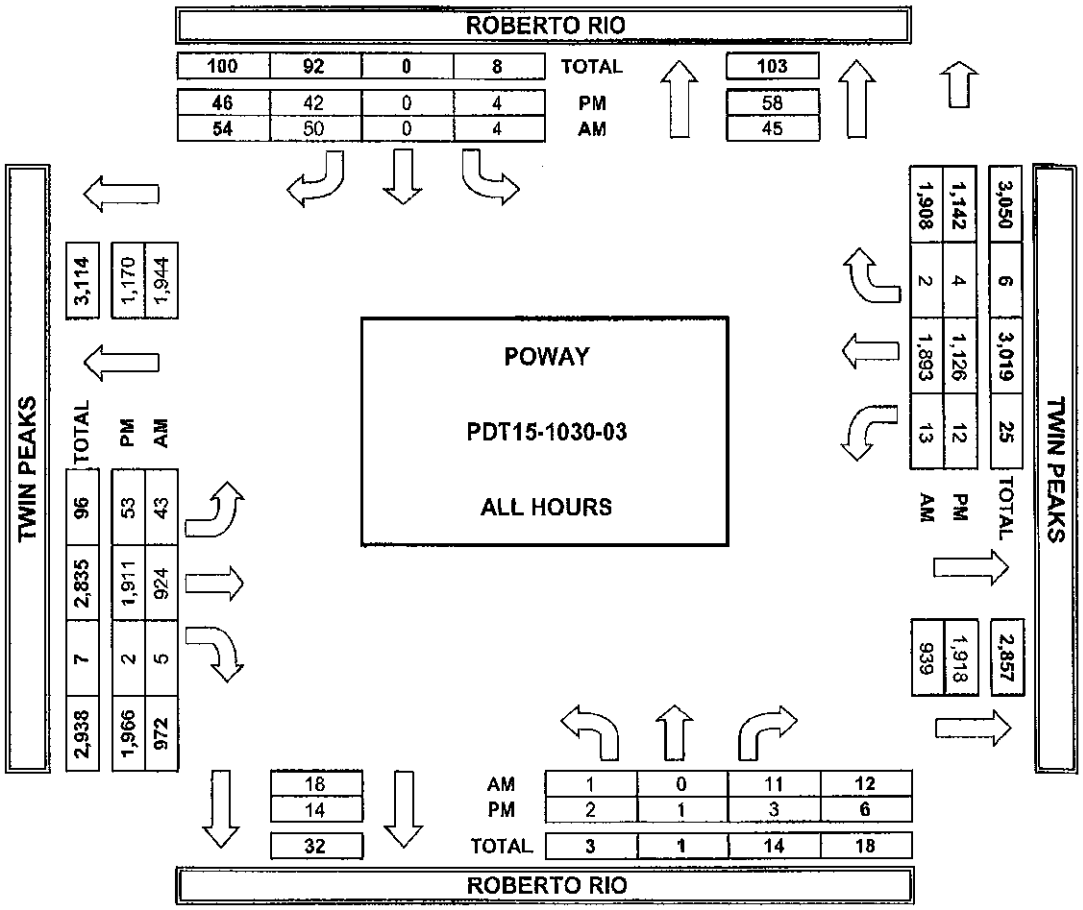
		NORTHBOUND ROBERTO RIO			SOUTHBOUND ROBERTO RIO			EASTBOUND TWIN PEAKS			WESTBOUND TWIN PEAKS				U-TURNS				
	LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 1	ET 2	ER 0	WL 1	WT 2	WR 0	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	0	0	6	0	0	11	14	156	2	5	257	0	451					0
	7:15 AM	1	0	2	0	0	8	6	119	0	2	324	0	462					0
	7:30 AM	0	0	0	2	0	6	2	100	1	2	256	1	370					0
	7:45 AM	0	0	1	0	0	2	2	95	0	2	216	0	318					0
	8:00 AM	0	0	0	0	0	5	4	118	1	1	225	1	355					0
	8:15 AM	0	0	0	0	0	5	4	142	0	0	225	0	376					0
	8:30 AM	0	0	1	1	0	8	5	96	1	0	192	0	304					0
	8:45 AM	0	0	1	1	0	5	6	98	0	1	198	0	310					0
	VOLUMES	1	0	11	4	0	50	43	924	5	13	1,893	2	2,946	0	0	0	0	0
	APPROACH %	8%	0%	92%	7%	0%	93%	4%	95%	1%	1%	99%	0%						
	APP/DEPART	12	/	45	54	/	18	972	/	939	1,908	/	1,944	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	1	0	9	2	0	27	24	470	3	11	1,053	1	1,601					
	APPROACH %	10%	0%	90%	7%	0%	93%	5%	95%	1%	1%	99%	0%						
	PEAK HR FACTOR		0.417			0.659			0.722			0.817		0.866					
	APP/DEPART	10	/	25	29	/	14	497	/	481	1,065	/	1,081	0					
PM	4:00 PM	0	0	0	0	0	6	5	239	0	2	142	0	394					0
	4:15 PM	0	0	0	0	0	4	3	240	1	2	156	0	406					0
	4:30 PM	0	0	1	1	0	3	2	224	0	1	131	1	364					0
	4:45 PM	1	1	0	0	0	5	7	258	1	4	149	1	427					0
	5:00 PM	1	0	1	0	0	5	8	262	0	2	148	0	427					0
	5:15 PM	0	0	1	1	0	7	13	222	0	0	134	1	379					0
	5:30 PM	0	0	0	0	0	6	8	248	0	0	145	0	407					0
	5:45 PM	0	0	0	2	0	6	7	218	0	1	121	1	356					0
	VOLUMES	2	1	3	4	0	42	53	1,911	2	12	1,126	4	3,160	0	0	0	0	0
	APPROACH %	33%	17%	50%	9%	0%	91%	3%	97%	0%	1%	99%	0%						
	APP/DEPART	6	/	58	46	/	14	1,966	/	1,918	1,142	/	1,170	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	2	1	2	1	0	23	36	990	1	6	576	2	1,640					
	APPROACH %	40%	20%	40%	4%	0%	96%	4%	96%	0%	1%	99%	0%						
	PEAK HR FACTOR		0.625			0.750			0.951			0.948		0.960					
	APP/DEPART	5	/	39	24	/	7	1,027	/	993	584	/	601	0					

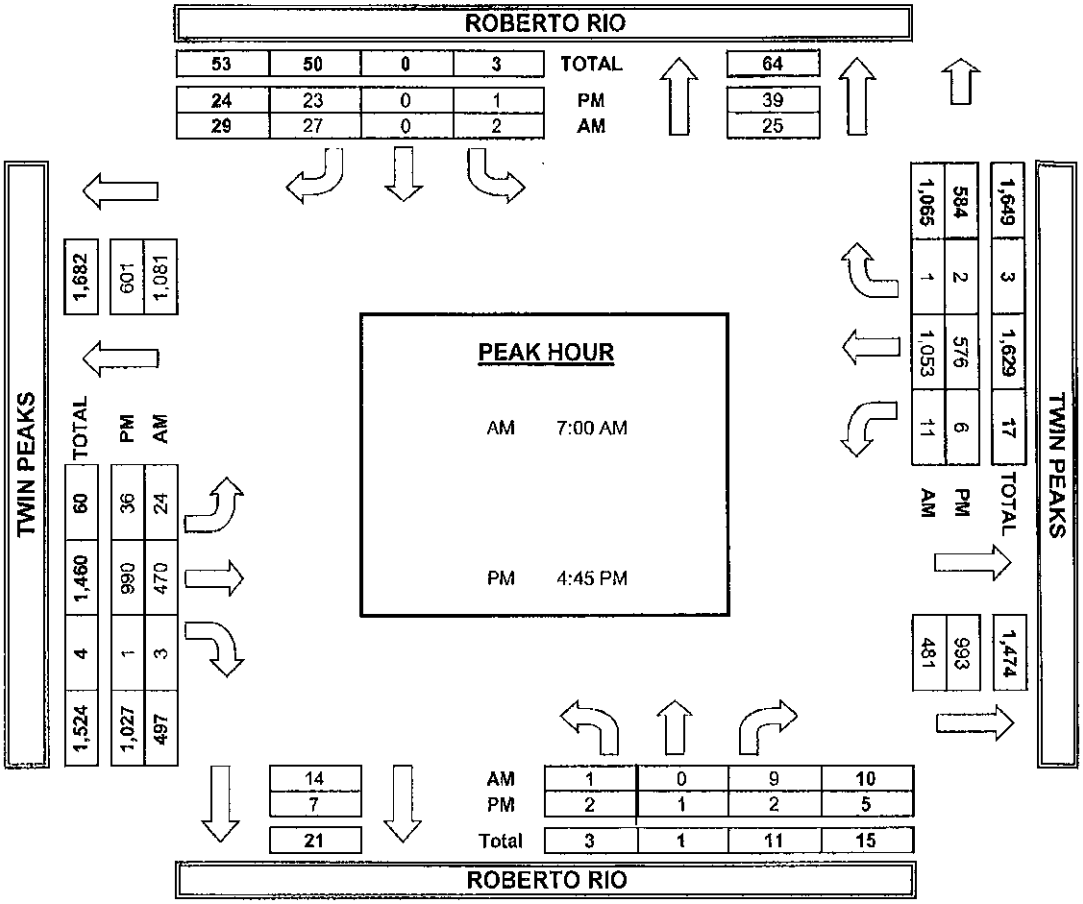


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

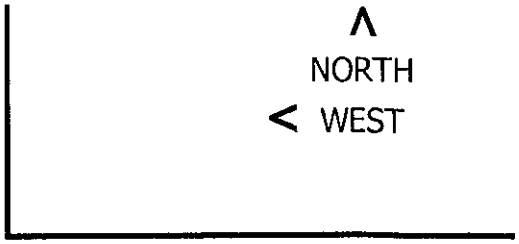
PACIFIC TECHNICAL DATA

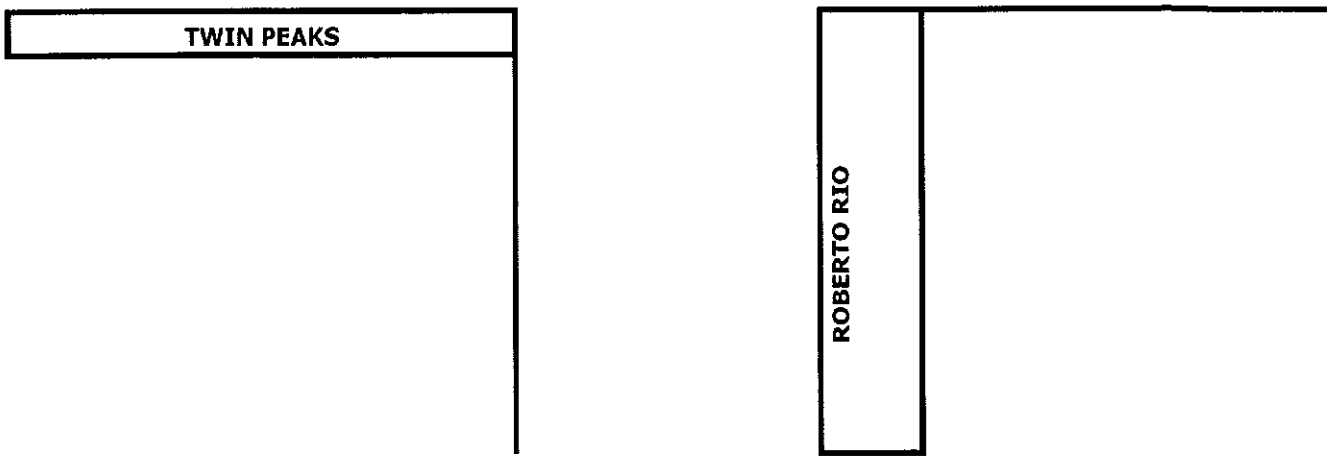
TURNING MOVEMENT COUNTS





CAM	LOCATION
	02





NORTH/SOUTH STREET	ROBERTO RIO
EAST/WEST STREET	TWIN PEAKS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
0700												
1600												

INTERSECTION TURNING MOVEMENT COUNTS

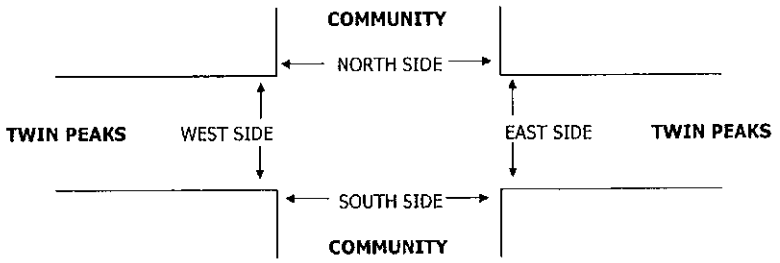
PREPARED BY: PACIFIC TECHNICAL DATA

DATE:	LOCATION:	POWAY	PROJECT #:	PDT15-1030-03
10/29/15	NORTH & SOUTH:	COMMUNITY	LOCATION #:	1
THURSDAY	EAST & WEST:	TWIN PEAKS	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ◄ W, E ►, ▲ N, S ▼

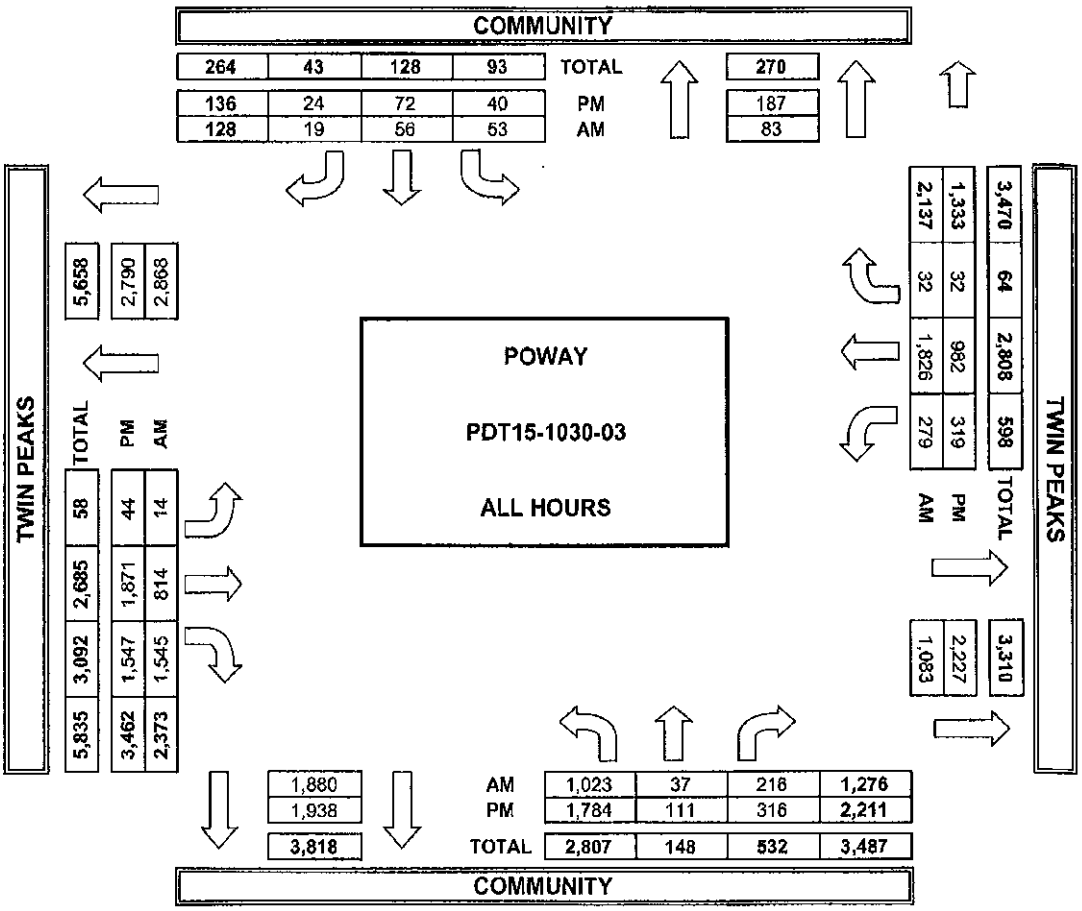
		NORTHBOUND COMMUNITY			SOUTHBOUND COMMUNITY			EASTBOUND TWIN PEAKS			WESTBOUND TWIN PEAKS				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	2	1	1	1	1	1	1	2	1	1	2	0		X	X	X	X	
AM	7:00 AM	122	2	28	3	8	4	1	88	184	30	208	3	681					0
AM	7:15 AM	131	4	20	5	9	1	1	95	212	31	216	4	729					0
AM	7:30 AM	156	5	31	8	10	1	2	91	203	25	235	4	771					0
AM	7:45 AM	122	5	33	12	7	4	1	101	218	38	241	4	786					0
AM	8:00 AM	118	6	30	8	5	2	1	121	189	41	255	2	778					0
AM	8:15 AM	125	8	25	10	4	1	2	103	174	44	223	5	724					0
AM	8:30 AM	135	5	24	5	8	2	4	118	184	32	242	4	763					0
AM	8:45 AM	114	2	25	2	5	4	2	97	181	38	206	6	682					0
AM	VOLUMES	1,023	37	216	53	56	19	14	814	1,545	279	1,826	32	5,914	0	0	0	0	0
AM	APPROACH %	80%	3%	17%	41%	44%	15%	1%	34%	65%	13%	85%	1%						
AM	APP/DEPART	1,276	/	83	128	/	1,880	2,373	/	1,083	2,137	/	2,868	0					
AM	BEGIN PEAK HR		7:15 AM																
AM	VOLUMES	527	20	114	33	31	8	5	408	822	135	947	14	3,064					
AM	APPROACH %	80%	3%	17%	46%	43%	11%	0%	33%	67%	12%	86%	1%						
AM	PEAK HR FACTOR		0.861			0.783			0.965			0.919		0.975					
AM	APP/DEPART	661	/	39	72	/	988	1,235	/	555	1,096	/	1,482	0					
PM	4:00 PM	212	11	31	4	3	2	4	209	169	44	109	3	801					0
PM	4:15 PM	206	18	40	4	8	1	2	219	184	38	114	6	840					0
PM	4:30 PM	213	16	44	6	9	2	8	255	191	40	121	4	909					0
PM	4:45 PM	229	10	51	5	12	1	4	262	212	41	132	5	964					0
PM	5:00 PM	245	19	40	7	8	3	4	252	208	40	128	5	959					0
PM	5:15 PM	235	11	35	5	15	6	8	230	200	48	122	4	919					0
PM	5:30 PM	226	18	44	4	8	5	5	221	189	35	135	2	892					0
PM	5:45 PM	218	8	31	5	9	4	9	223	194	33	121	3	858					0
PM	VOLUMES	1,784	111	316	40	72	24	44	1,871	1,547	319	982	32	7,142	0	0	0	0	0
PM	APPROACH %	81%	5%	14%	29%	53%	18%	1%	54%	45%	24%	74%	2%						
PM	APP/DEPART	2,211	/	187	136	/	1,938	3,462	/	2,227	1,333	/	2,790	0					
PM	BEGIN PEAK HR		4:30 PM																
PM	VOLUMES	922	56	170	23	44	12	24	999	811	169	503	18	3,751					
PM	APPROACH %	80%	5%	15%	29%	56%	15%	1%	54%	44%	24%	73%	3%						
PM	PEAK HR FACTOR		0.944			0.760			0.959			0.969		0.973					
PM	APP/DEPART	1,148	/	98	79	/	1,024	1,834	/	1,192	690	/	1,437	0					

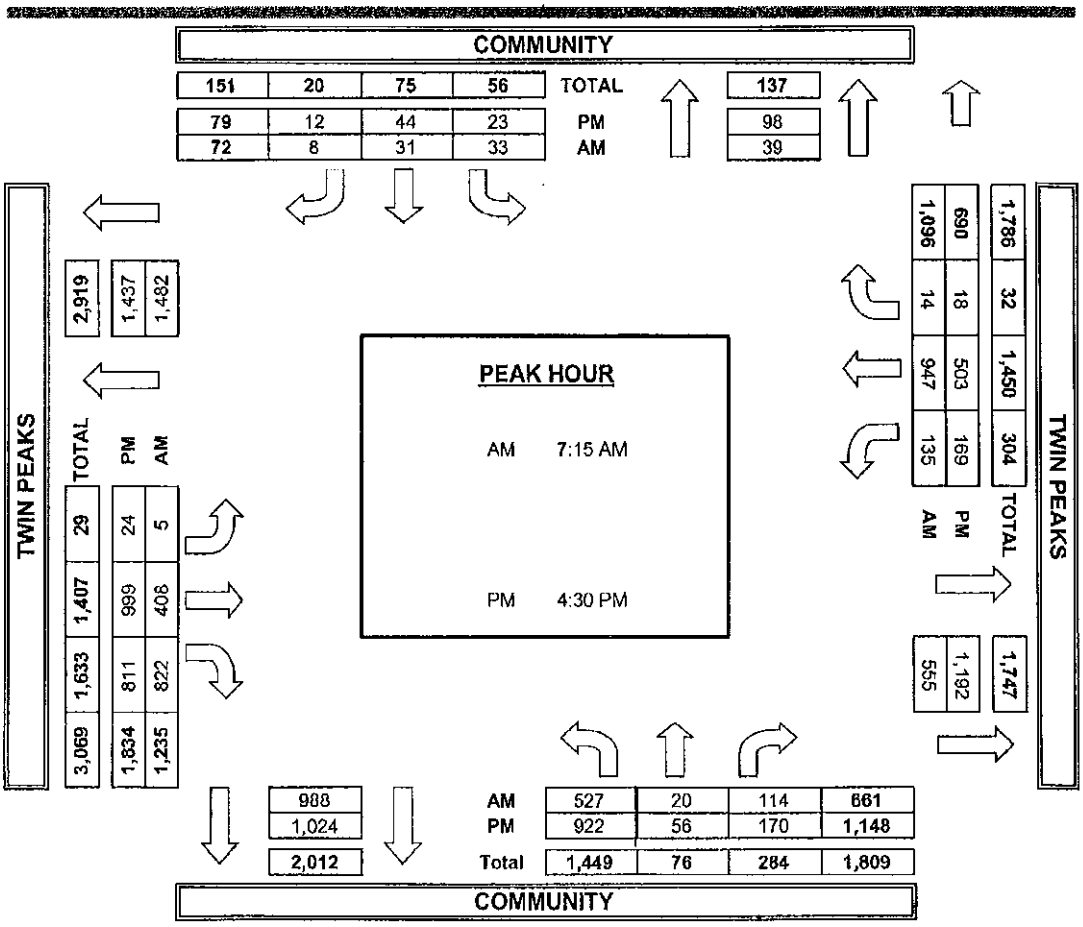


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
AM	7:15 AM					0					0					0
AM	7:30 AM					0					0					0
AM	7:45 AM					0					0					0
AM	8:00 AM					0					0					0
AM	8:15 AM					0					0					0
AM	8:30 AM					0					0					0
AM	8:45 AM					0					0					0
AM	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
PM	4:15 PM					0					0					0
PM	4:30 PM					0					0					0
PM	4:45 PM					0					0					0
PM	5:00 PM					0					0					0
PM	5:15 PM					0					0					0
PM	5:30 PM					0					0					0
PM	5:45 PM					0					0					0
PM	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





CAM	LOCATION
	01

^ NORTH
< WEST

TWIN PEAKS

COMMUNITY

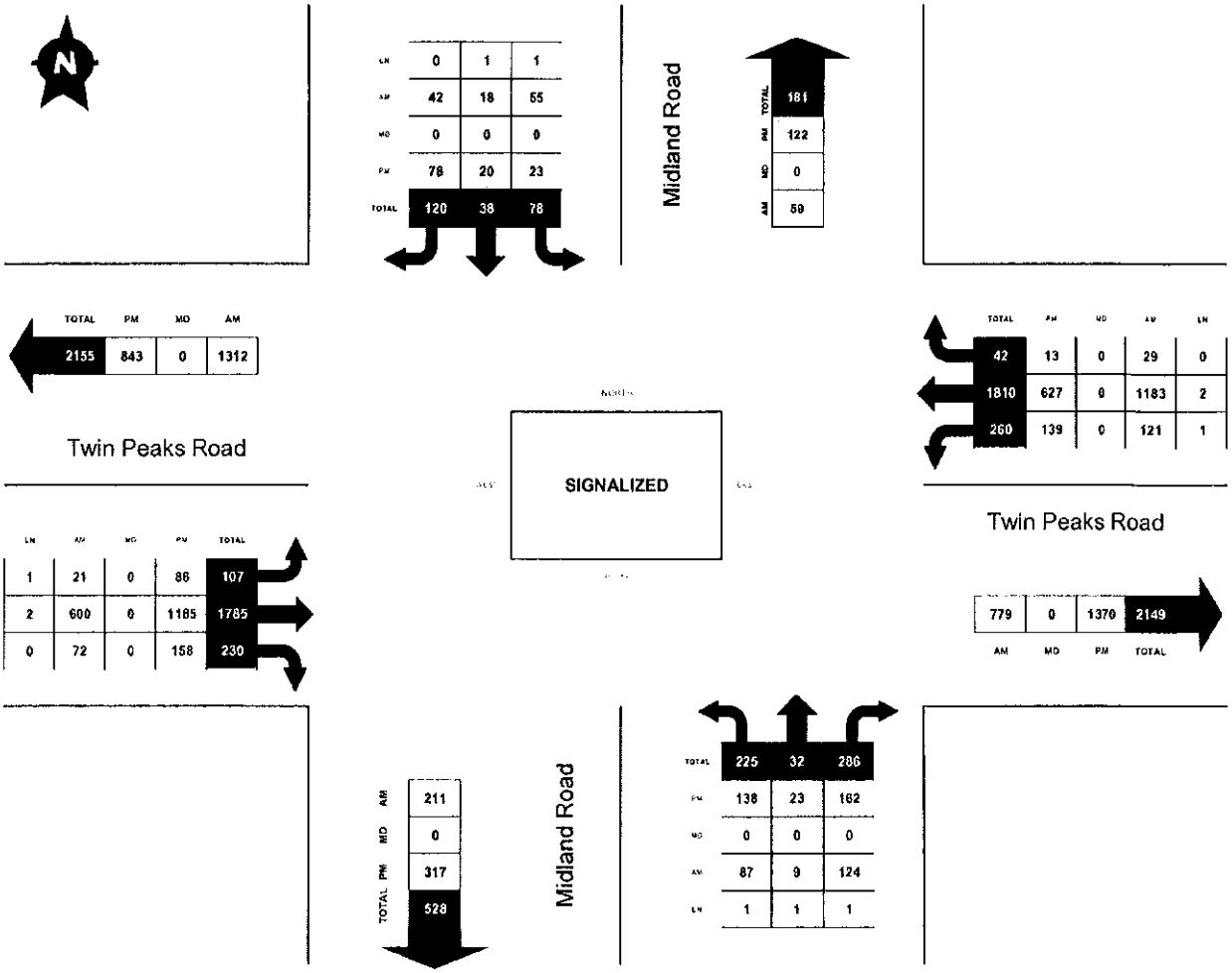
NORTH/SOUTH STREET	COMMUNITY
EAST/WEST STREET	TWIN PEAKS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
0700												
1600												

PEAK HOUR ITM SUMMARY

#015 Midland Road & Twin Peaks Road

LOCATION#:	015	QTD PROJ#:	700138	AM PEAK:	700 AM
NORTH / SOUTH:	Midland Road	DATE:	Wednesday, April 11, 2012	MD PEAK:	
EAST / WEST:	Twin Peaks Road	VICINITY:	City of Poway, CA	PM PEAK:	415 PM



	LT	RT	TOTAL
AM	42	18	55
MD	0	0	0
PM	78	20	23
TOTAL	120	38	78

	TOTAL
AM	59
MD	0
PM	122
TOTAL	181

	TOTAL	PM	MD	AM
	2155	843	0	1312

	TOTAL	PM	MD	AM	LT
	42	13	0	29	0
	1810	627	0	1183	2
	260	139	0	121	1

	LT	AM	MD	PM	TOTAL
	1	21	0	86	107
	2	600	0	1185	1785
	0	72	0	158	230

	AM	MD	PM	TOTAL
	779	0	1370	2149

	AM	MD	PM
TOTAL	211	0	317
	528		

	RT	TOTAL	LT
TOTAL	225	32	286
PM	138	23	162
MD	0	0	0
AM	87	9	124
LT	1	1	1

AM COUNT	7:00 AM	TO	9:00 AM	MD COUNT	-	TO	-	PM COUNT	4:00 PM	TO	6:00 PM

QUALITY TRAFFIC DATA, LLC
9701 W Pico Blvd, Suite 205, Los Angeles, CA 90035
Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

VEHICLE TURNING MOVEMENT COUNT

#015 Midland Road & Twin Peaks Road - AM PEAK

LOCATION#:	015	QTD PROJ#:	700138
NORTH / SOUTH:	Midland Road	DATE:	Wednesday, April 11, 2012
EAST / WEST:	Twin Peaks Road	VICINITY:	City of Poway, CA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	1	1	1	1	0	1	2	0	1	2	0	
7:00 AM	20	1	38	21	6	8	3	189	13	25	261	5	590
7:15 AM	26	1	32	18	2	9	2	151	18	27	348	9	643
7:30 AM	22	4	27	9	1	12	6	140	23	39	321	9	613
7:45 AM	19	3	27	7	9	13	10	120	18	30	253	6	515
8:00 AM	24	3	35	8	2	7	10	123	12	34	269	9	536
8:15 AM	18	3	33	6	6	8	16	121	13	29	272	8	533
8:30 AM	25	3	23	4	4	10	25	98	16	18	231	3	460
8:45 AM	20	3	23	4	6	12	26	87	13	13	214	5	426

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	174	21	238	77	36	79	98	1029	126	215	2169	54	4316
P.H.V: (1)	87	9	124	55	18	42	21	600	72	121	1183	29	2361
P.H.F: (2)	0.932			0.821			0.845			0.868			0.918

(1) Peak Hour Volume (Peak Hour Begins At 700 AM)
(2) Peak Hour Factor (directional aggregate)

QUALITY TRAFFIC DATA, LLC
9701 W Pico Blvd, Suite 205, Los Angeles, CA 90035
Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

VEHICLE TURNING MOVEMENT COUNT

#015 Midland Road & Twin Peaks Road - PM PEAK

LOCATION#:	015
NORTH / SOUTH:	Midland Road
EAST / WEST:	Twin Peaks Road

QTD PROJ#:	700138
DATE:	Wednesday, April 11, 2012
VICINITY:	City of Poway, CA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	1	1	1	1	0	1	2	0	1	2	0	
4:00 PM	33	3	40	10	3	14	26	220	41	34	127	8	559
4:15 PM	36	6	36	6	6	14	23	277	46	33	141	6	630
4:30 PM	31	6	41	10	4	22	24	309	41	35	146	3	672
4:45 PM	31	6	45	1	5	20	22	298	35	35	171	1	670
5:00 PM	40	5	40	6	5	22	17	301	36	36	169	3	680
5:15 PM	36	3	44	3	5	15	12	284	39	34	142	4	621
5:30 PM	33	6	45	7	4	14	10	266	33	27	131	5	581
5:45 PM	28	14	41	10	4	11	12	261	42	34	123	6	586

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	268	49	332	53	36	132	146	2216	313	268	1150	36	4999
P.H.V: (1)	138	23	162	23	20	78	86	1185	158	139	627	13	2652
P.H.F: (2)		0.950			0.840			0.955			0.936		0.975

(1) Peak Hour Volume (Peak Hour Begins At 415 PM)
(2) Peak Hour Factor (directional aggregate)

QUALITY TRAFFIC DATA, LLC
9701 W Pico Blvd, Suite 205, Los Angeles, CA 90035
Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

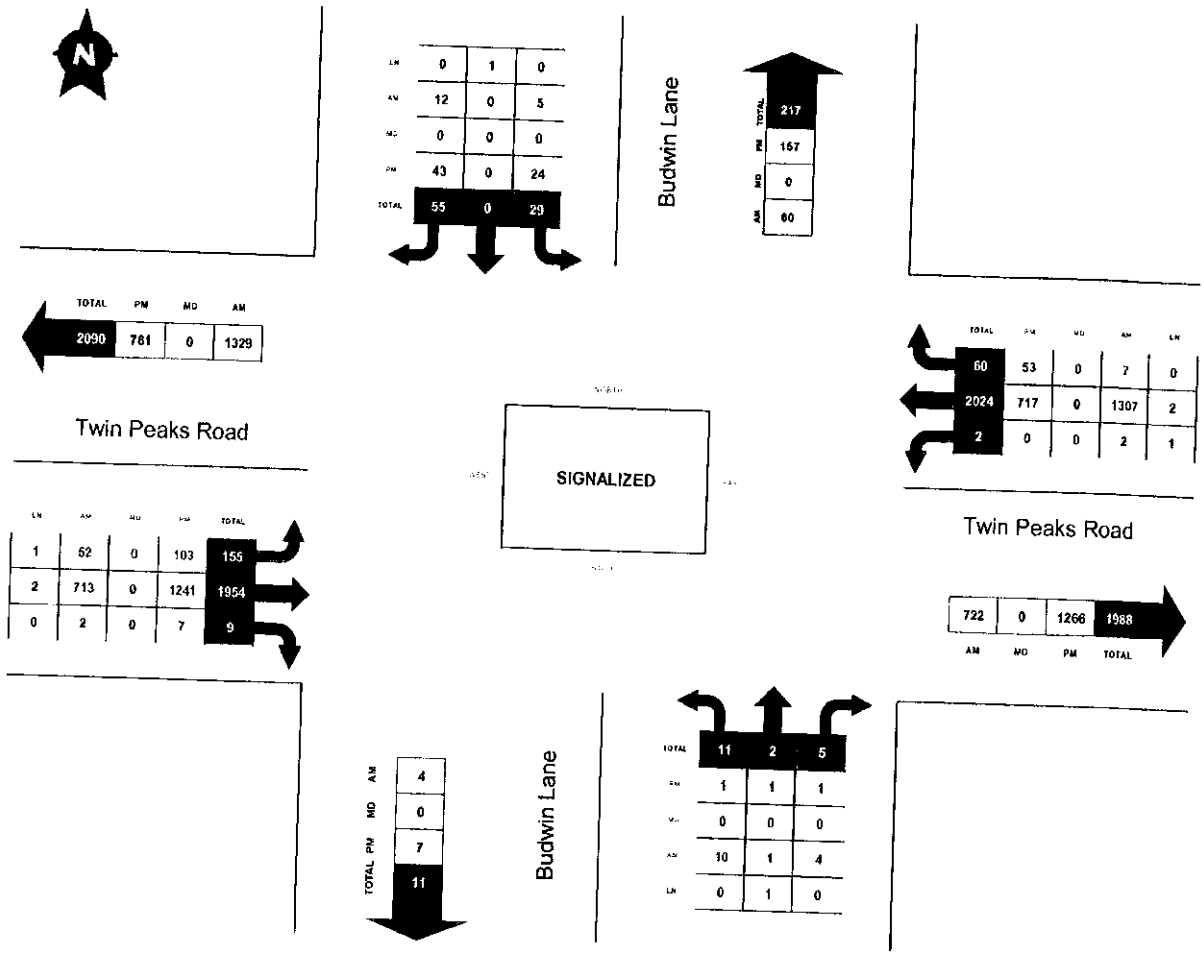
PEAK HOUR ITM SUMMARY

#016 Budwin Lane & Twin Peaks Road

LOCATION#:	016
NORTH / SOUTH:	Budwin Lane
EAST / WEST:	Twin Peaks Road

QTD PROJ#:	700138
DATE:	Tuesday, April 24, 2012
VICINITY:	City of Poway, CA

AM PEAK:	700 AM
MD PEAK:	
PM PEAK:	430 PM



	TOTAL	PM	MD	AM
Budwin Lane	217	167	0	60

	TOTAL	PM	MD	AM
Twin Peaks Road	2090	761	0	1329

	TOTAL	PM	MD	AM
Twin Peaks Road	722	0	1266	1988

	TOTAL	PM	MD	AM
Budwin Lane	11	7	0	4

	TOTAL	LN	AM	MD	PM
Budwin Lane	55	0	12	0	43
	0	1	0	0	0
	29	0	5	0	24

	TOTAL	LN	AM	MD	PM
Twin Peaks Road	2024	2	717	0	1307
	60	0	53	0	7
	2	0	0	2	1

	TOTAL	LN	AM	MD	PM
Twin Peaks Road	155	1	52	0	103
	1954	2	713	0	1241
	9	0	2	0	7

	TOTAL	LN	AM	MD	PM
Budwin Lane	11	0	10	0	1
	2	1	1	0	1
	5	0	4	0	1

AM COUNT	7:00 AM TO 9:00 AM
MD COUNT	- TO -
PM COUNT	4:00 PM TO 6:00 PM

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VEHICLE TURNING MOVEMENT COUNT

#016 Budwin Lane & Twin Peaks Road - AM PEAK

LOCATION#:	016
NORTH / SOUTH:	Budwin Lane
EAST / WEST:	Twin Peaks Road

QTD PROJ#:	700138
DATE:	Tuesday, April 24, 2012
VICINITY:	City of Poway, CA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	0	1	0	0	1	0	1	2	0	1	2	0	
7:00 AM	4	0	2	1	0	1	12	234	0	0	293	0	547
7:15 AM	1	0	1	2	0	4	13	186	1	0	378	3	589
7:30 AM	2	1	1	1	0	2	13	162	1	2	360	3	548
7:45 AM	3	0	0	1	0	5	14	131	0	0	276	1	431
8:00 AM	2	0	1	0	0	12	15	150	1	0	293	1	475
8:15 AM	2	1	0	2	0	10	19	130	2	0	304	4	474
8:30 AM	1	0	1	1	1	7	10	117	1	0	238	7	384
8:45 AM	2	0	0	1	0	7	14	93	0	1	226	8	352

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	17	2	6	9	1	48	110	1203	6	3	2368	27	3800
P.H.V: (1)	10	1	4	5	0	12	52	713	2	2	1307	7	2115
P.H.F: (2)	0.625			0.708			0.779			0.864			0.898

(1) Peak Hour Volume (Peak Hour Begins At 700 AM)
(2) Peak Hour Factor (directional aggregate)

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VEHICLE TURNING MOVEMENT COUNT

#016 Budwin Lane & Twin Peaks Road - PM PEAK

LOCATION#:	016
NORTH / SOUTH:	Budwin Lane
EAST / WEST:	Twin Peaks Road

QTD PROJ#:	700138
DATE:	Tuesday, April 24, 2012
VICINITY:	City of Poway, CA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	0	1	0	0	1	0	1	2	0	1	2	0	
4:00 PM	1	0	0	8	0	4	16	247	0	0	163	2	441
4:15 PM	1	0	0	2	0	5	23	288	1	0	168	5	493
4:30 PM	0	1	0	4	0	7	27	320	4	0	172	15	550
4:45 PM	1	0	0	6	0	11	28	305	1	0	190	14	556
5:00 PM	0	0	1	5	0	15	25	312	2	0	184	9	553
5:15 PM	0	0	0	9	0	10	23	304	0	0	171	15	532
5:30 PM	0	0	1	8	0	11	25	284	0	1	146	10	486
5:45 PM	0	0	0	2	0	6	21	291	2	2	152	1	477

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	3	1	2	44	0	69	188	2351	10	3	1346	71	4088
P.H.V: (1)	1	1	1	24	0	43	103	1241	7	0	717	53	2191
P.H.F: (2)	0.750			0.838			0.962			0.944			0.985

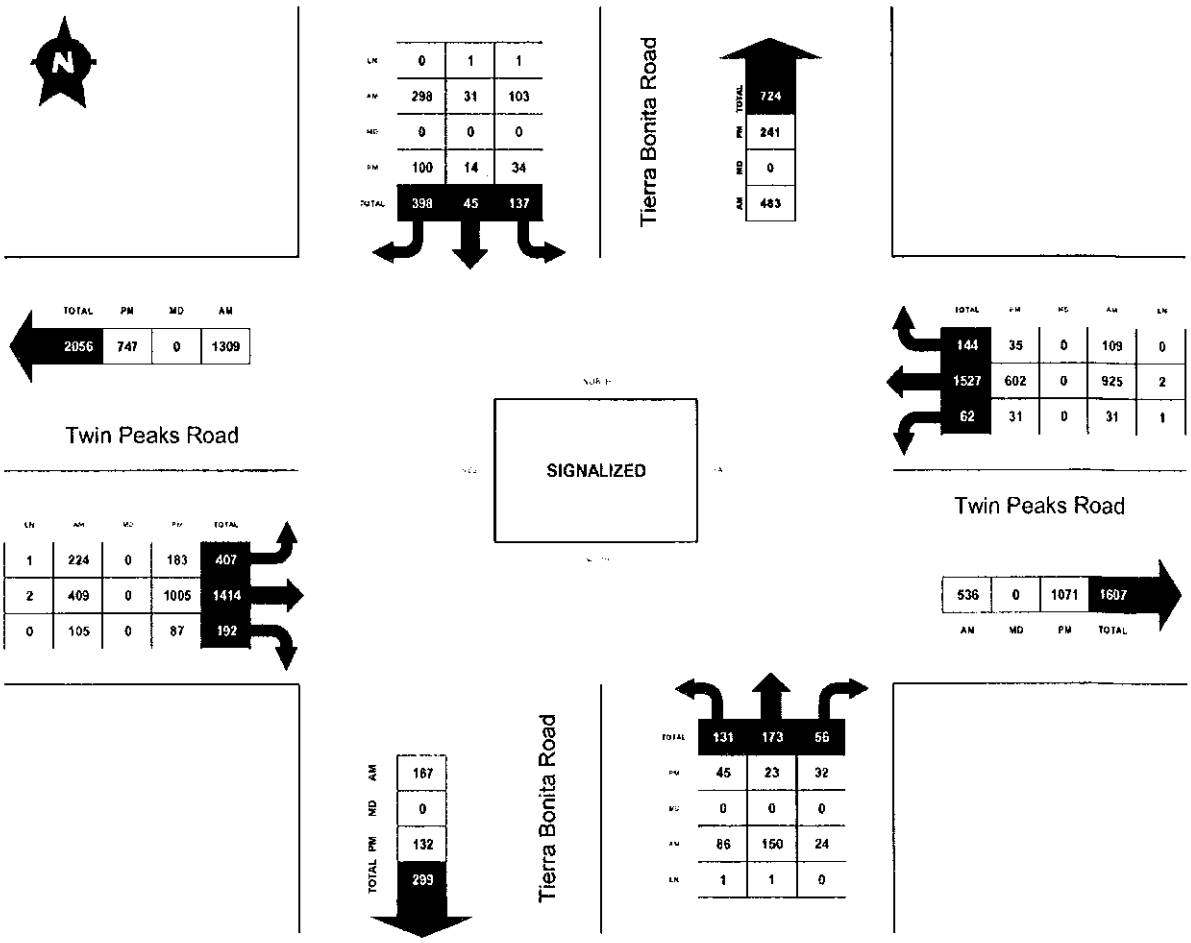
(1) Peak Hour Volume (Peak Hour Begins At 430 PM)
(2) Peak Hour Factor (directional aggregate)

QUALITY TRAFFIC DATA, LLC
9701 W Pico Blvd, Suite 205, Los Angeles, CA 90035
Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

PEAK HOUR ITM SUMMARY

#017 Tierra Bonita Road & Twin Peaks Road

LOCATION#:	017	QTO PROJ#:	700138	AM PEAK:	700 AM
NORTH / SOUTH:	Tierra Bonita Road	DATE:	Wednesday, April 25, 2012	MD PEAK:	
EAST / WEST:	Twin Peaks Road	VICINITY:	City of Poway, CA	PM PEAK:	430 PM



AM COUNT	7:00 AM	TO	9:00 AM	MD COUNT	-	TO	-	PM COUNT	4:00 PM TO 6:00 PM

QUALITY TRAFFIC DATA, LLC
9701 W Pico Blvd, Suite 205, Los Angeles, CA 90035
Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

VEHICLE TURNING MOVEMENT COUNT

#017 Tierra Bonita Road & Twin Peaks Road - AM PEAK

LOCATION#:	017
NORTH / SOUTH:	Tierra Bonita Road
EAST / WEST:	Twin Peaks Road

QTD PROJ#:	700138
DATE:	Wednesday, April 25, 2012
VICINITY:	City of Poway, CA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	1	0	1	1	0	1	2	0	1	2	0	
7:00 AM	19	29	5	14	5	29	71	134	31	5	244	38	624
7:15 AM	22	42	9	27	7	63	64	99	33	15	288	40	709
7:30 AM	20	54	5	32	9	134	49	93	29	8	209	21	663
7:45 AM	25	25	5	30	10	72	40	83	12	3	184	10	499
8:00 AM	32	24	7	24	14	66	39	87	18	3	199	9	522
8:15 AM	31	26	7	22	15	68	24	95	13	3	206	8	518
8:30 AM	26	22	7	25	9	55	22	89	9	7	157	5	433
8:45 AM	13	18	2	26	0	53	25	61	7	5	161	5	376

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	188	240	47	200	69	540	334	741	152	49	1648	136	4344
P.H.V: (1)	86	150	24	103	31	298	224	409	105	31	925	109	2495
P.H.F: (2)	0.823			0.617			0.782			0.776			0.880

(1) Peak Hour Volume (Peak Hour Begins At 700 AM)
(2) Peak Hour Factor (directional aggregate)

QUALITY TRAFFIC DATA, LLC
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Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

VEHICLE TURNING MOVEMENT COUNT

#017 Tierra Bonita Road & Twin Peaks Road - PM PEAK

LOCATION#:	017
NORTH / SOUTH:	Tierra Bonita Road
EAST / WEST:	Twin Peaks Road

QTD PROJ#:	700138
DATE:	Wednesday, April 25, 2012
VICINITY:	City of Poway, CA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	1	0	1	1	0	1	2	0	1	2	0	
4:00 PM	9	11	10	9	11	24	32	209	18	6	126	8	473
4:15 PM	12	5	7	9	6	26	37	230	22	6	135	4	499
4:30 PM	14	8	9	5	2	22	47	251	17	4	150	9	538
4:45 PM	8	7	6	7	7	34	43	255	20	10	156	13	566
5:00 PM	13	5	8	8	1	28	46	256	21	10	145	11	552
5:15 PM	10	3	9	14	4	16	47	243	29	7	151	2	535
5:30 PM	7	5	8	10	3	29	45	239	17	10	123	4	500
5:45 PM	10	8	11	7	9	26	31	242	16	9	113	4	486

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	83	52	68	69	43	205	328	1925	160	62	1099	55	4149
P.H.V: (1)	45	23	32	34	14	100	183	1005	87	31	602	35	2191
P.H.F: (2)	0.806			0.771			0.987			0.933			0.968

(1) Peak Hour Volume (Peak Hour Begins At 430 PM)
(2) Peak Hour Factor (directional aggregate)

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Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

Appendix C

Existing Traffic Counts without School (August 2015)

8451 Miralani Dr., Suite A • San Diego, CA 92126 • (858) 560-4911 • Fax (858) 560-9734

WEDNESDAY, AUGUST 12, 2015 CITY: POWAY PROJECT: PTD15-0812-03

1-A) TWIN PEAKS WEST OF ROBERT RIO

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			20		4			12:00			145		122		
00:15			11		8			12:15			142		140		
00:30			8		5			12:30			110		150		
00:45			10	49	6	23	72	12:45			151	548	123	535	1083
01:00			8		5			13:00			150		118		
01:15			8		2			13:15			143		113		
01:30			7		4			13:30			139		119		
01:45			5	28	2	13	41	13:45			164	596	142	492	1088
02:00			3		2			14:00			116		126		
02:15			2		5			14:15			148		132		
02:30			2		4			14:30			184		141		
02:45			3	10	4	15	25	14:45			189	637	153	552	1189
03:00			3		3			15:00			200		166		
03:15			4		3			15:15			204		137		
03:30			1		6			15:30			188		153		
03:45			3	11	9	21	32	15:45			189	781	157	613	1394
04:00			5		8			16:00			218		129		
04:15			8		13			16:15			232		123		
04:30			3		31			16:30			249		139		
04:45			3	19	28	80	99	16:45			268	967	135	526	1493
05:00			5		30			17:00			260		174		
05:15			13		49			17:15			210		129		
05:30			13		94			17:30			212		148		
05:45			20	51	100	273	324	17:45			261	943	139	590	1533
06:00			36		101			18:00			177		103		
06:15			31		127			18:15			171		100		
06:30			48		158			18:30			175		97		
06:45			55	170	196	582	752	18:45			191	714	115	415	1129
07:00			79		172			19:00			150		72		
07:15			97		237			19:15			154		91		
07:30			64		247			19:30			144		95		
07:45			100	340	246	902	1242	19:45			136	584	103	361	945
08:00			92		230			20:00			100		75		
08:15			87		214			20:15			134		83		
08:30			94		210			20:30			105		65		
08:45			97	370	211	865	1235	20:45			114	453	60	283	736
09:00			101		146			21:00			115		69		
09:15			128		166			21:15			72		41		
09:30			85		141			21:30			79		39		
09:45			101	415	174	627	1042	21:45			65	331	37	186	517
10:00			112		126			22:00			59		28		
10:15			105		139			22:15			57		31		
10:30			108		147			22:30			51		21		
10:45			131	456	136	548	1004	22:45			44	211	19	99	310
11:00			118		146			23:00			38		14		
11:15			140		152			23:15			24		18		
11:30			120		175			23:30			40		26		
11:45			126	504	142	615	1119	23:45			20	122	12	70	192
Total Vol.				2423		4564	**6987**					6887		4722	**11609**

Daily Totals

	NB	SB	EB	WB	Combined
			9310	9286	**18596**
	AM		**PM**		
Split %	34.7%	65.3%	59.3%	40.7%	**62.4%**
Peak Hour	11:30	07:15	16:15	15:00	**16:15**
Volume	533	960	1009	613	**1580**
P.H.F.	0.92	0.97	0.94	0.92	**0.91**

WEDNESDAY, AUGUST 12, 2015 CITY: POWAY PROJECT: PTD15-0812-03

2-B) TWIN PEAKS EAST OF ROBERT RIO

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			18		4			12:00			141		118		
00:15			11		8			12:15			150		131		
00:30			7		7			12:30			111		149		
00:45			11	47	6	25	72	12:45			142	544	114	512	1056
01:00			9		6			13:00			148		114		
01:15			7		1			13:15			140		123		
01:30			6		4			13:30			133		119		
01:45			4	26	3	14	40	13:45			151	572	134	490	1062
02:00			2		1			14:00			120		130		
02:15			2		5			14:15			142		124		
02:30			2		4			14:30			184		143		
02:45			4	10	4	14	24	14:45			191	637	150	547	1184
03:00			2		3			15:00			189		166		
03:15			2		3			15:15			212		137		
03:30			1		6			15:30			180		146		
03:45			4	9	8	20	29	15:45			179	760	154	603	1363
04:00			4		8			16:00			215		124		
04:15			7		11			16:15			233		122		
04:30			2		30			16:30			249		143		
04:45			2	15	27	76	91	16:45			251	948	133	522	1470
05:00			5		28			17:00			242		172		
05:15			12		45			17:15			238		124		
05:30			10		87			17:30			215		146		
05:45			18	45	95	255	300	17:45			241	936	135	577	1513
06:00			37		101			18:00			180		106		
06:15			32		120			18:15			162		101		
06:30			41		153			18:30			174		86		
06:45			52	162	194	568	730	18:45			189	705	114	407	1112
07:00			79		163			19:00			151		71		
07:15			90		238			19:15			142		93		
07:30			77		231			19:30			140		85		
07:45			89	335	241	873	1208	19:45			132	565	104	353	918
08:00			90		229			20:00			103		70		
08:15			88		208			20:15			129		83		
08:30			96		217			20:30			110		66		
08:45			91	365	209	863	1228	20:45			113	455	54	273	728
09:00			99		144			21:00			110		66		
09:15			121		162			21:15			80		42		
09:30			90		137			21:30			70		38		
09:45			95	405	166	609	1014	21:45			61	321	36	182	503
10:00			106		121			22:00			58		27		
10:15			111		141			22:15			51		30		
10:30			99		141			22:30			50		18		
10:45			128	444	135	538	982	22:45			42	201	19	94	295
11:00			120		140			23:00			39		14		
11:15			138		151			23:15			21		18		
11:30			126		169			23:30			38		27		
11:45			120	504	138	598	1102	23:45			19	117	12	71	188
Total Vol.				2367		4453	**6820**					6761		4631	**11392**

Daily Totals

	NB	SB	EB	WB	**Combined**
			9128	9084	**18212**
	AM		**PM**		
Split %	34.7%	65.3%	**37.4%**	59.3%	40.7%	**62.6%**
Peak Hour	11:30	07:15	**07:15**	16:30	15:00	**16:30**
Volume	537	939	**1285**	980	603	**1552**
P.H.F.	0.90	0.97	**0.97**	0.98	0.91	**0.94**

PACIFIC TECHNICAL DATA

INTERSECTION TURNING MOVEMENT COUNTS

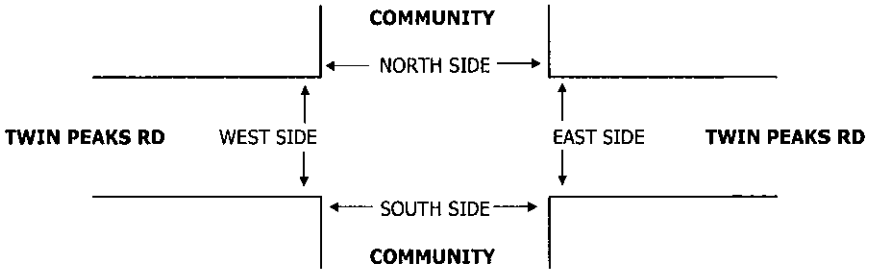
PREPARED BY: PACIFIC TECHNICAL DATA

DATE: 8/12/15 WEDNESDAY				
	LOCATION:	POWAY	PROJECT #:	PDT15-0814-03
	NORTH & SOUTH:	COMMUNITY	LOCATION #:	1
	EAST & WEST:	TWIN PEAKS RD	CONTROL:	SIGNAL

NOTES:

AM		▲ N	
PM			
MD	◄ W		E ►
OTHER		S ▼	
OTHER			

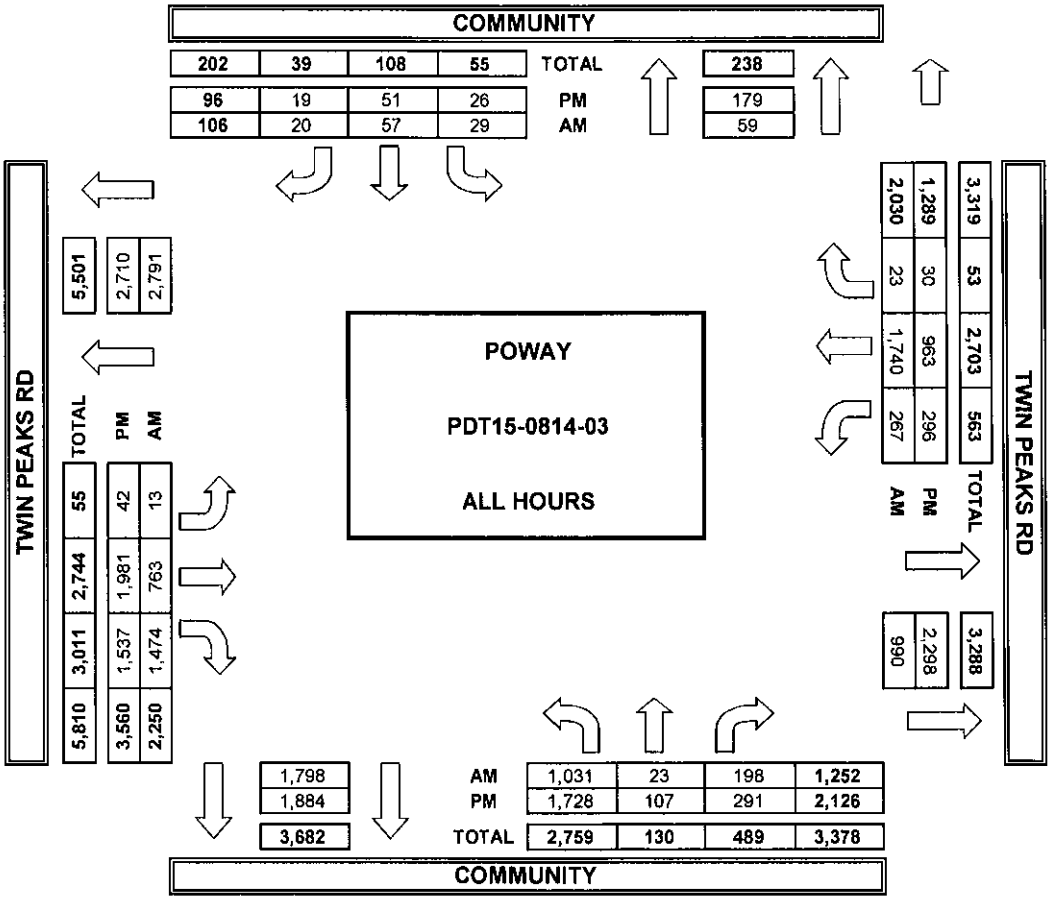
		NORTHBOUND COMMUNITY			SOUTHBOUND COMMUNITY			EASTBOUND TWIN PEAKS RD			WESTBOUND TWIN PEAKS RD				U-TURNS				
	LANES:	NL 2	NT 1	NR 1	SL 1	ST 1	SR 1	EL 1	ET 2	ER 1	WL 1	WT 2	WR 0	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	114	3	17	6	4	3	0	75	178	20	191	2	613					0
	7:15 AM	132	0	22	1	4	3	0	81	194	26	200	2	665				1	1
	7:30 AM	141	3	27	5	6	1	3	86	183	32	229	0	716					0
	7:45 AM	135	3	32	9	8	2	2	103	201	44	253	6	798					0
	8:00 AM	125	6	22	5	8	1	4	96	167	42	239	5	720					0
	8:15 AM	135	3	20	1	8	2	2	101	198	37	231	5	743					0
	8:30 AM	121	2	27	1	7	6	1	114	167	26	217	2	691					0
	8:45 AM	128	3	31	1	12	2	1	107	186	40	180	1	692			1	3	4
	VOLUMES	1,031	23	198	29	57	20	13	763	1,474	267	1,740	23	5,638	0	0	1	4	5
	APPROACH %	82%	2%	16%	27%	54%	19%	1%	34%	66%	13%	86%	1%						
	APP/DEPART	1,252	/	59	106	/	1,798	2,250	/	990	2,030	/	2,791	0					
	BEGIN PEAK HR		7:30 AM																
	VOLUMES	536	15	101	20	30	6	11	386	749	155	952	16	2,977					
	APPROACH %	82%	2%	15%	36%	54%	11%	1%	34%	65%	14%	85%	1%						
	PEAK HR FACTOR		0.953			0.737			0.936			0.927		0.933					
	APP/DEPART	652	/	42	56	/	934	1,146	/	507	1,123	/	1,494	0					
PM	4:00 PM	208	15	36	3	6	4	2	223	186	40	107	2	832				1	1
	4:15 PM	193	16	37	1	6	0	3	229	196	34	102	1	818					0
	4:30 PM	208	8	38	5	3	0	8	278	190	33	113	4	888				2	2
	4:45 PM	244	13	46	5	2	6	6	287	190	39	125	7	970					0
	5:00 PM	226	18	32	3	11	3	7	256	181	45	147	7	936				3	3
	5:15 PM	228	13	36	5	10	1	3	226	188	38	116	1	865					0
	5:30 PM	218	10	30	4	6	2	4	245	218	32	128	3	900					0
	5:45 PM	203	14	36	0	7	3	9	237	188	35	125	5	862					0
	VOLUMES	1,728	107	291	26	51	19	42	1,981	1,537	296	963	30	7,071	0	0	0	6	6
	APPROACH %	81%	5%	14%	27%	53%	20%	1%	56%	43%	23%	75%	2%						
	APP/DEPART	2,126	/	179	96	/	1,884	3,560	/	2,298	1,289	/	2,710	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	916	54	144	17	29	12	20	1,014	777	154	516	18	3,671					
	APPROACH %	82%	5%	13%	29%	50%	21%	1%	56%	43%	22%	75%	3%						
	PEAK HR FACTOR		0.919			0.853			0.937			0.864		0.946					
	APP/DEPART	1,114	/	92	58	/	960	1,811	/	1,175	688	/	1,444	0					

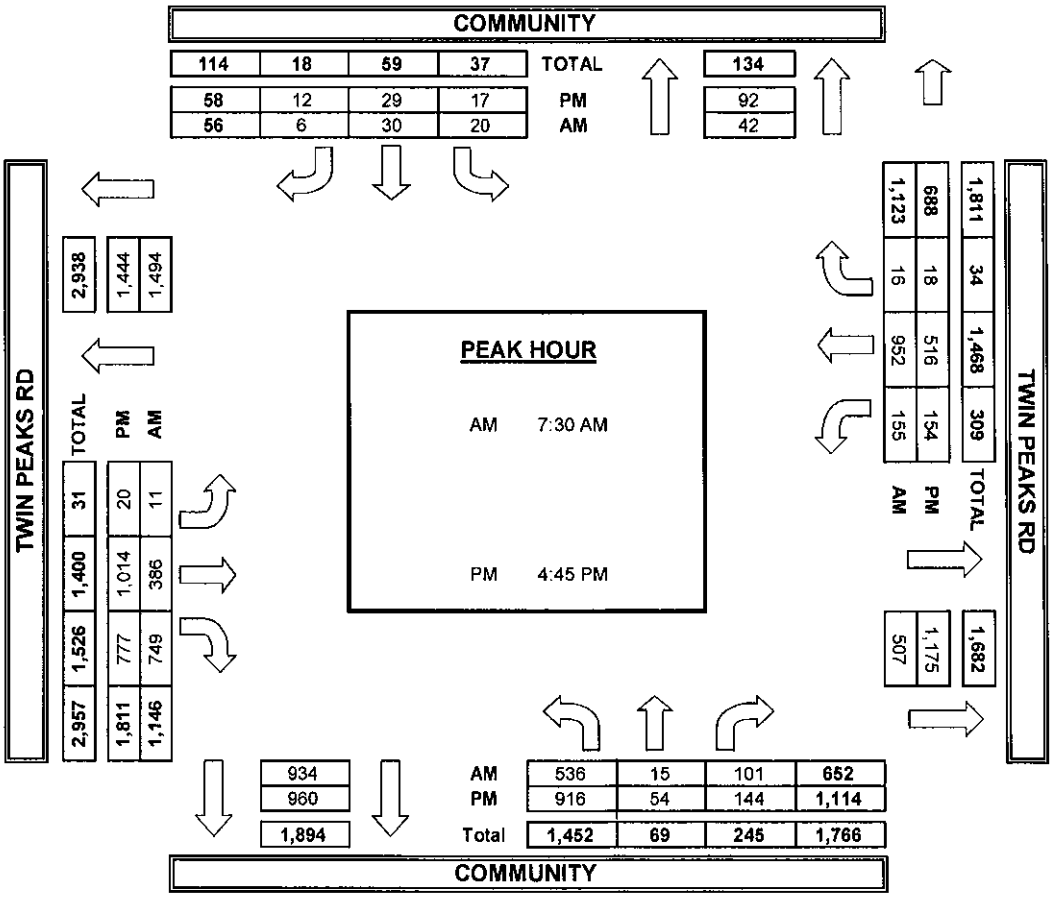


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

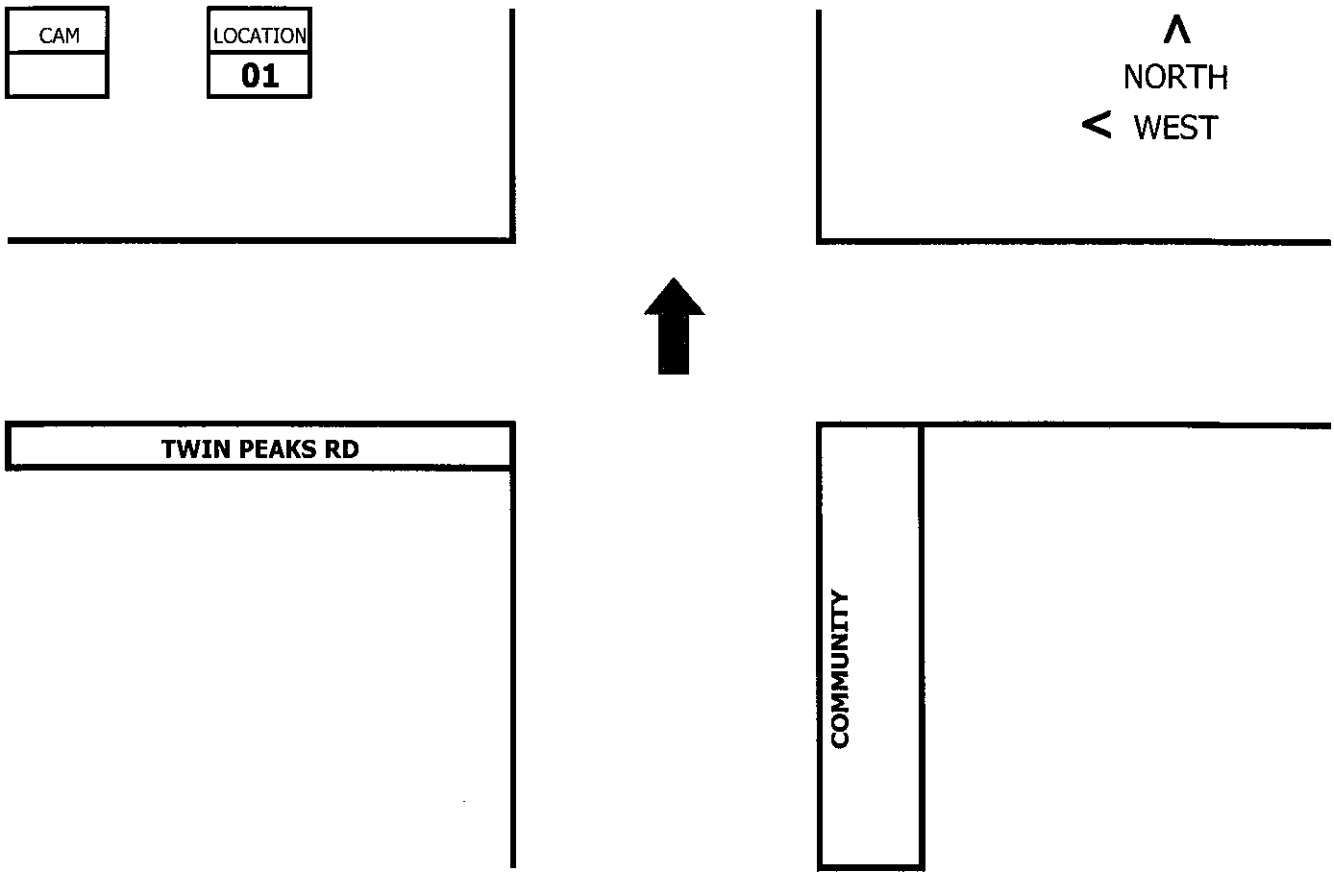
PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





CAM	LOCATION
	01



NORTH/SOUTH STREET	COMMUNITY
EAST/WEST STREET	TWIN PEAKS RD

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
0700												
1600												

INTERSECTION TURNING MOVEMENT COUNTS

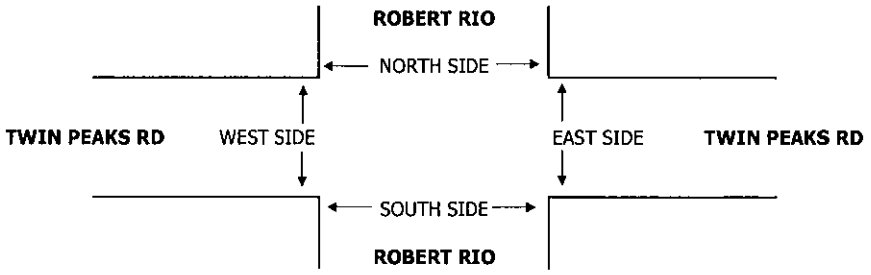
PREPARED BY: PACIFIC TECHNICAL DATA

DATE:	LOCATION:	POWAY	PROJECT #:	PDT15-0814-03
8/12/15	NORTH & SOUTH:	ROBERT RIO	LOCATION #:	2
WEDNESDAY	EAST & WEST:	TWIN PEAKS RD	CONTROL:	2-WAY STOP (NS)

NOTES:

AM		▲ N	
PM			
MD	◄ W		E ►
OTHER		S ▼	
OTHER			

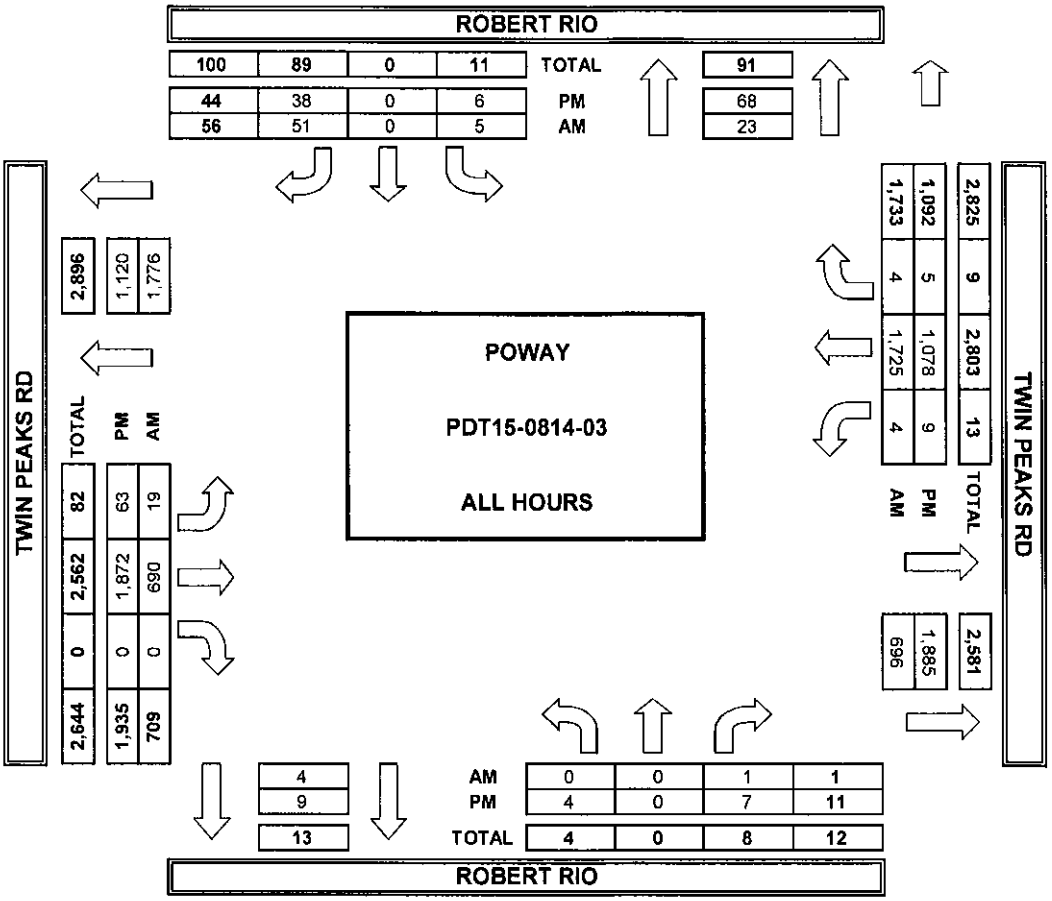
		NORTHBOUND ROBERT RIO			SOUTHBOUND ROBERT RIO			EASTBOUND TWIN PEAKS RD			WESTBOUND TWIN PEAKS RD				U-TURNS				
	LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 1	ET 2	ER 0	WL 1	WT 2	WR 0	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	0	0	0	0	0	6	1	79	0	0	165	0	251					0
	7:15 AM	0	0	0	0	0	8	5	92	0	1	232	1	339				1	1
	7:30 AM	0	0	0	0	0	11	0	78	0	0	223	1	313					0
	7:45 AM	0	0	0	1	0	5	2	93	0	0	244	0	345					0
	8:00 AM	0	0	0	2	0	7	3	82	0	0	234	1	329					0
	8:15 AM	0	0	1	0	0	6	3	85	0	0	208	0	303					0
	8:30 AM	0	0	0	0	0	6	2	94	0	0	212	0	314					0
	8:45 AM	0	0	0	2	0	2	3	87	0	3	207	1	305			1	3	4
	VOLUMES	0	0	1	5	0	51	19	690	0	4	1,725	4	2,499	0	0	1	4	5
	APPROACH %	0%	0%	100%	9%	0%	91%	3%	97%	0%	0%	100%	0%						
	APP/DEPART	1	/	23	56	/	4	709	/	696	1,733	/	1,776	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	0	0	0	3	0	31	10	345	0	1	933	3	1,326					
	APPROACH %	0%	0%	0%	9%	0%	91%	3%	97%	0%	0%	100%	0%						
	PEAK HR FACTOR		0.000			0.773			0.915			0.960		0.961					
	APP/DEPART	0	/	13	34	/	1	355	/	348	937	/	964	0					
PM	4:00 PM	2	0	0	2	0	4	5	215	0	1	121	0	350				1	1
	4:15 PM	0	0	1	0	0	2	8	229	0	1	119	0	360					0
	4:30 PM	0	0	1	1	0	7	7	256	0	3	126	1	402				2	2
	4:45 PM	0	0	1	1	0	3	5	254	0	1	150	0	415					0
	5:00 PM	0	0	2	0	0	4	13	235	0	3	163	0	420				3	3
	5:15 PM	2	0	1	0	0	6	7	229	0	0	122	2	369					0
	5:30 PM	0	0	1	1	0	4	5	212	0	0	145	0	368					0
	5:45 PM	0	0	0	1	0	8	13	242	0	0	132	2	398					0
	VOLUMES	4	0	7	6	0	38	63	1,872	0	9	1,078	5	3,082	0	0	0	6	6
	APPROACH %	36%	0%	64%	14%	0%	86%	3%	97%	0%	1%	99%	0%						
	APP/DEPART	11	/	68	44	/	9	1,935	/	1,885	1,092	/	1,120	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	2	0	5	2	0	20	32	974	0	7	561	3	1,606					
	APPROACH %	29%	0%	71%	9%	0%	91%	3%	97%	0%	1%	98%	1%						
	PEAK HR FACTOR		0.583			0.688			0.956			0.860		0.956					
	APP/DEPART	7	/	35	22	/	7	1,006	/	981	571	/	583	0					

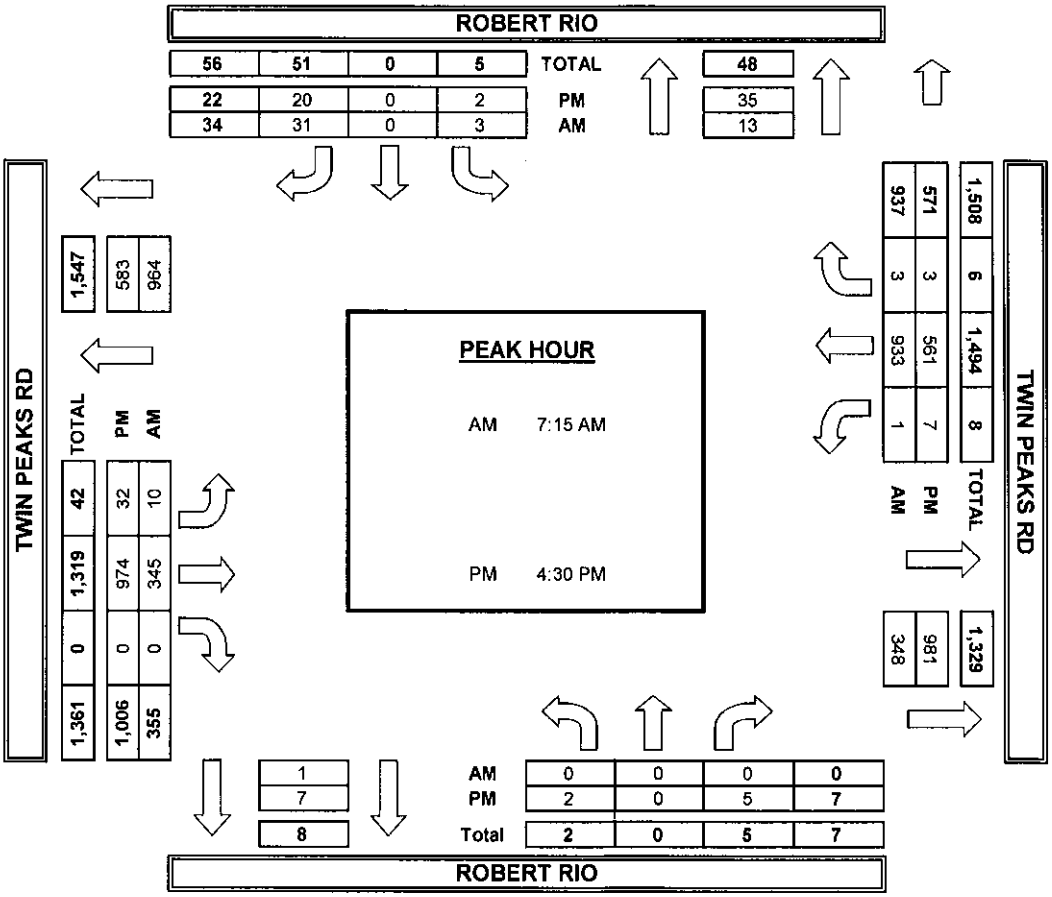


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

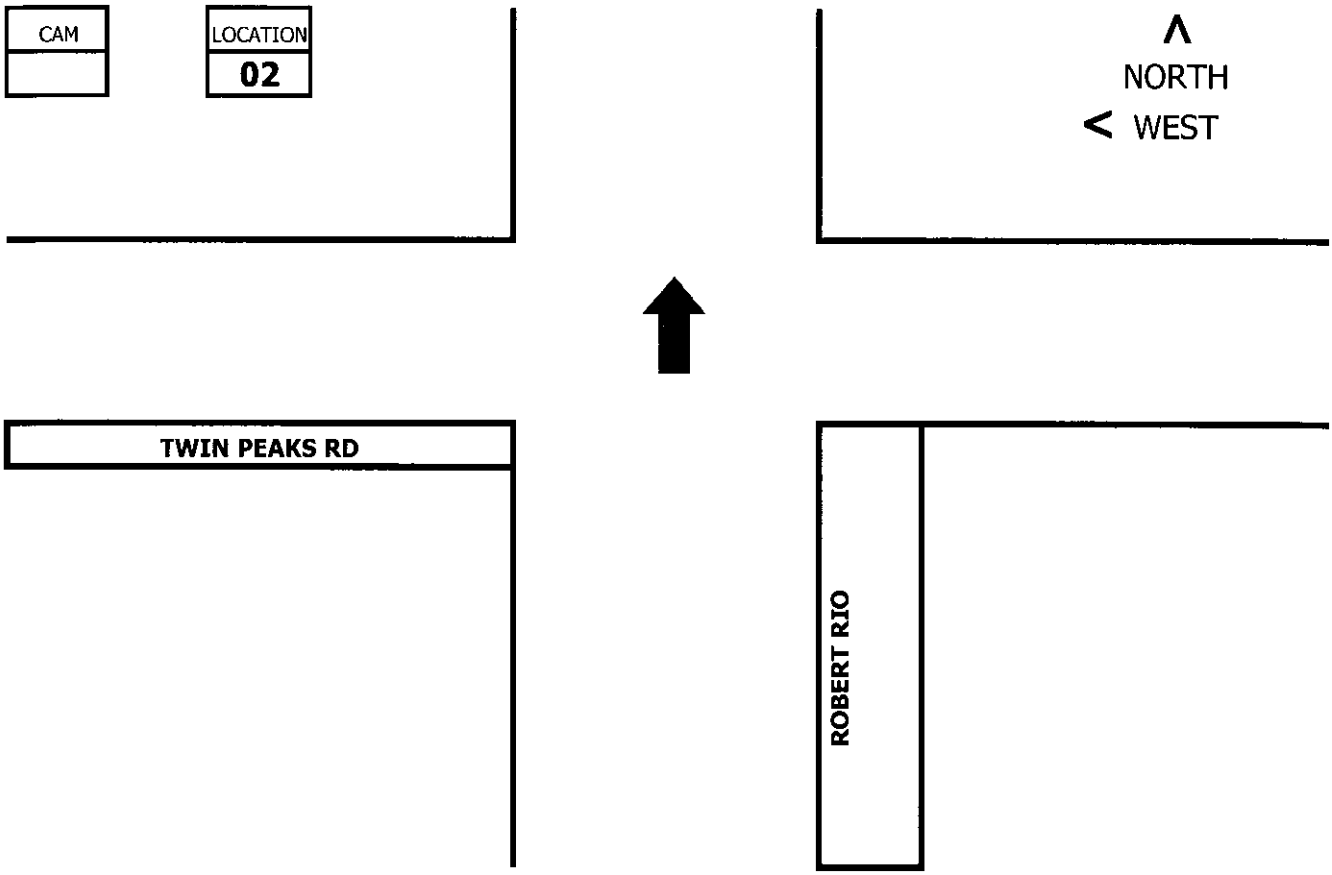
PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





CAM	LOCATION
	02



NORTH/SOUTH STREET	ROBERT RIO
EAST/WEST STREET	TWIN PEAKS RD

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
0700												
1600												

INTERSECTION TURNING MOVEMENT COUNTS

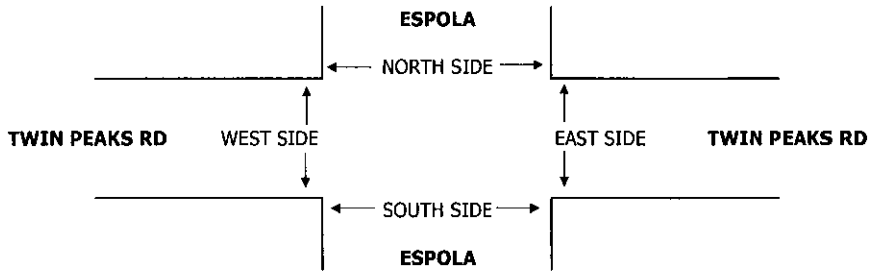
PREPARED BY: PACIFIC TECHNICAL DATA

DATE: 8/12/15 WEDNESDAY	LOCATION:	POWAY	PROJECT #:	PDT15-0814-03
	NORTH & SOUTH:	ESPOLA	LOCATION #:	3
	EAST & WEST:	TWIN PEAKS RD	CONTROL:	SIGNAL

NOTES:

AM		▲ N	
PM			
MD	◄ W		E ►
OTHER		S ▼	
OTHER			

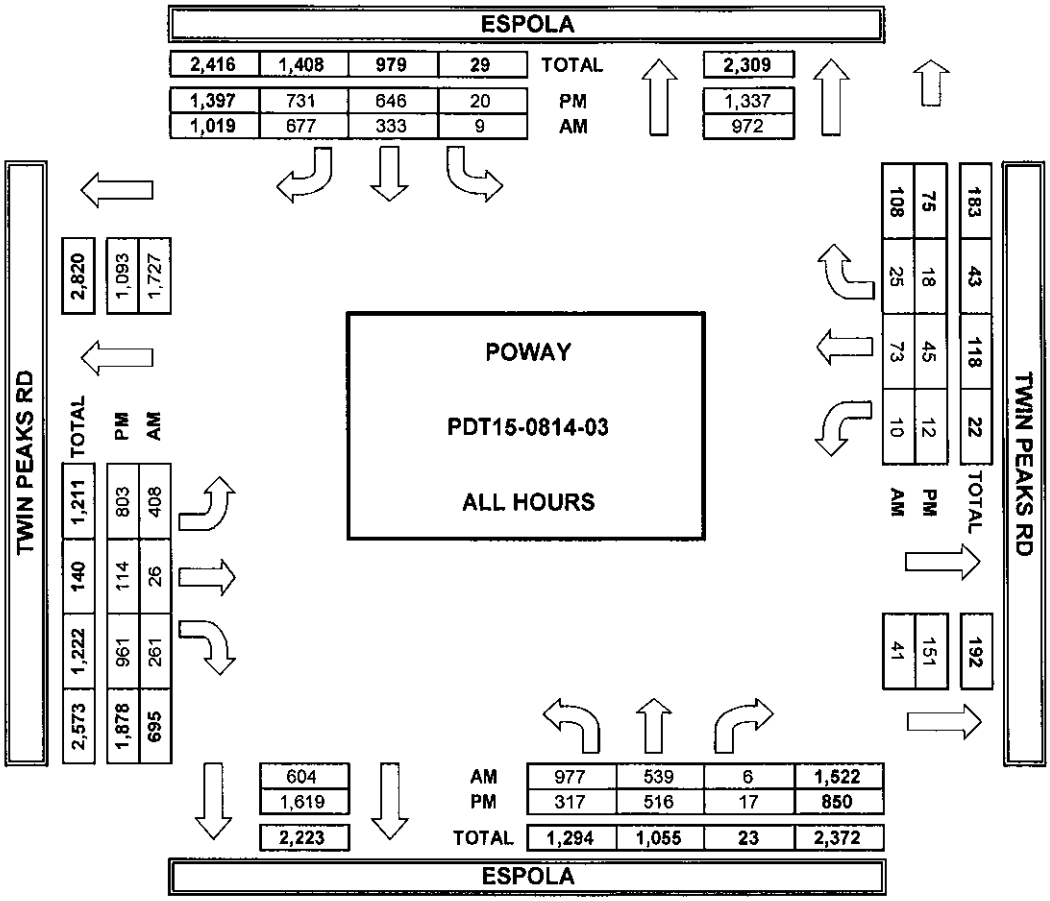
		NORTHBOUND ESPOLA			SOUTHBOUND ESPOLA			EASTBOUND TWIN PEAKS RD			WESTBOUND TWIN PEAKS RD				U-TURNS				
	LANES:	NL 1	NT 1	NR 1	SL 1	ST 1	SR 1	EL 2	ET 1	ER 1	WL 1	WT 1	WR 0	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	98	62	0	0	20	61	50	1	29	4	7	3	335					0
	7:15 AM	148	72	1	2	41	90	53	4	33	0	9	3	456					0
	7:30 AM	117	68	0	2	48	98	40	2	26	3	12	3	419					0
	7:45 AM	145	82	1	2	47	89	60	5	42	2	7	3	485					0
	8:00 AM	133	72	2	0	39	88	46	5	26	0	10	5	426					0
	8:15 AM	117	55	0	2	60	69	53	5	29	1	11	1	403					0
	8:30 AM	118	77	0	1	30	94	51	1	39	0	9	1	421					0
	8:45 AM	101	51	2	0	48	88	55	3	37	0	8	6	399					0
	VOLUMES	977	539	6	9	333	677	408	26	261	10	73	25	3,344	0	0	0	0	0
	APPROACH %	64%	35%	0%	1%	33%	66%	59%	4%	38%	9%	68%	23%						
	APP/DEPART	1,522	/	972	1,019	/	604	695	/	41	108	/	1,727	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	543	294	4	6	175	365	199	16	127	5	38	14	1,786					
	APPROACH %	65%	35%	0%	1%	32%	67%	58%	5%	37%	9%	67%	25%						
	PEAK HR FACTOR		0.922			0.922			0.799			0.792		0.921					
	APP/DEPART	841	/	507	546	/	307	342	/	26	57	/	946	0					
PM	4:00 PM	29	54	1	5	88	101	87	5	127	1	4	1	503					0
	4:15 PM	34	70	6	1	72	83	106	18	116	1	4	1	512					0
	4:30 PM	44	61	1	1	88	90	102	13	122	1	5	3	531					0
	4:45 PM	42	81	3	1	71	85	128	20	116	1	4	3	555					0
	5:00 PM	39	53	2	4	96	127	95	16	147	2	6	5	592					0
	5:15 PM	34	69	2	2	88	71	87	16	102	3	9	3	486					0
	5:30 PM	51	69	1	4	76	91	92	16	101	1	3	1	506					0
	5:45 PM	44	59	1	2	67	83	106	10	130	2	10	1	515					0
	VOLUMES	317	516	17	20	646	731	803	114	961	12	45	18	4,200	0	0	0	0	0
	APPROACH %	37%	61%	2%	1%	46%	52%	43%	6%	51%	16%	60%	24%						
	APP/DEPART	850	/	1,337	1,397	/	1,619	1,878	/	151	75	/	1,093	0					
	BEGIN PEAK HR		4:15 PM																
	VOLUMES	159	265	12	7	327	385	431	67	501	5	19	12	2,190					
	APPROACH %	36%	61%	3%	1%	45%	54%	43%	7%	50%	14%	53%	33%						
	PEAK HR FACTOR		0.865			0.792			0.946			0.692		0.925					
	APP/DEPART	436	/	708	719	/	833	999	/	86	36	/	563	0					

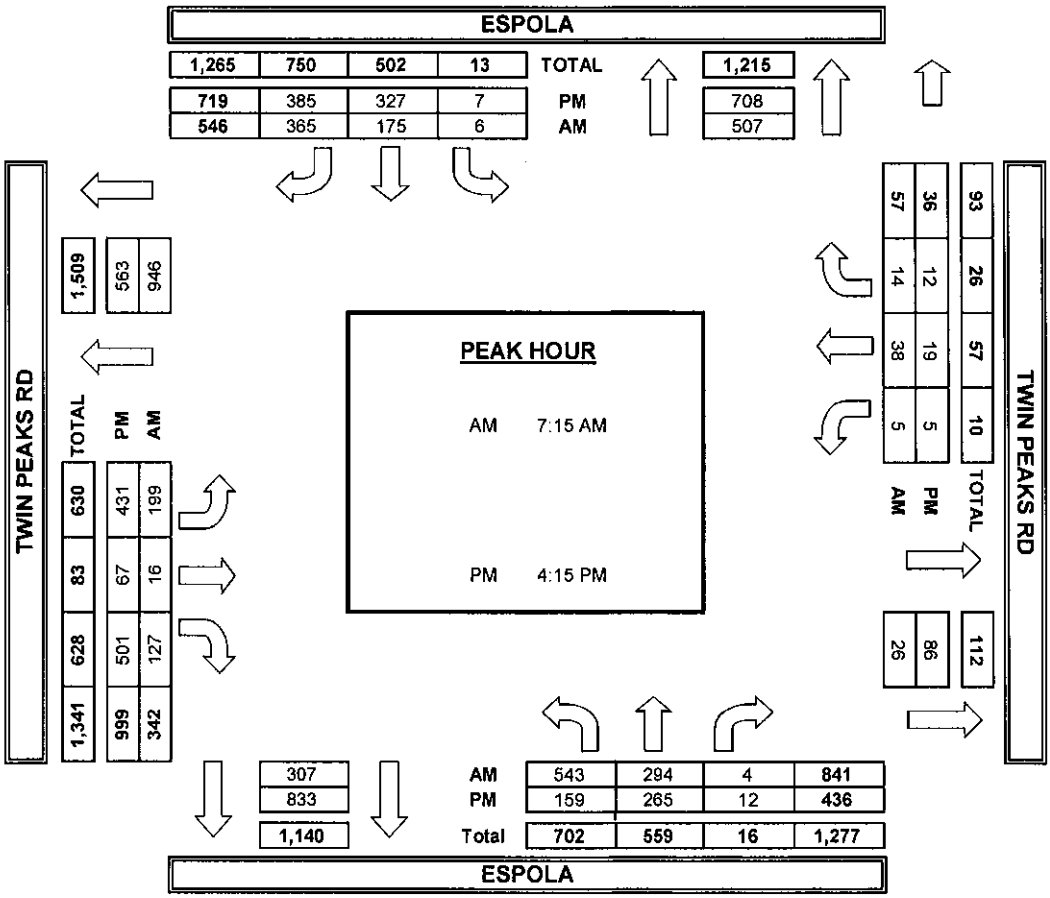


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

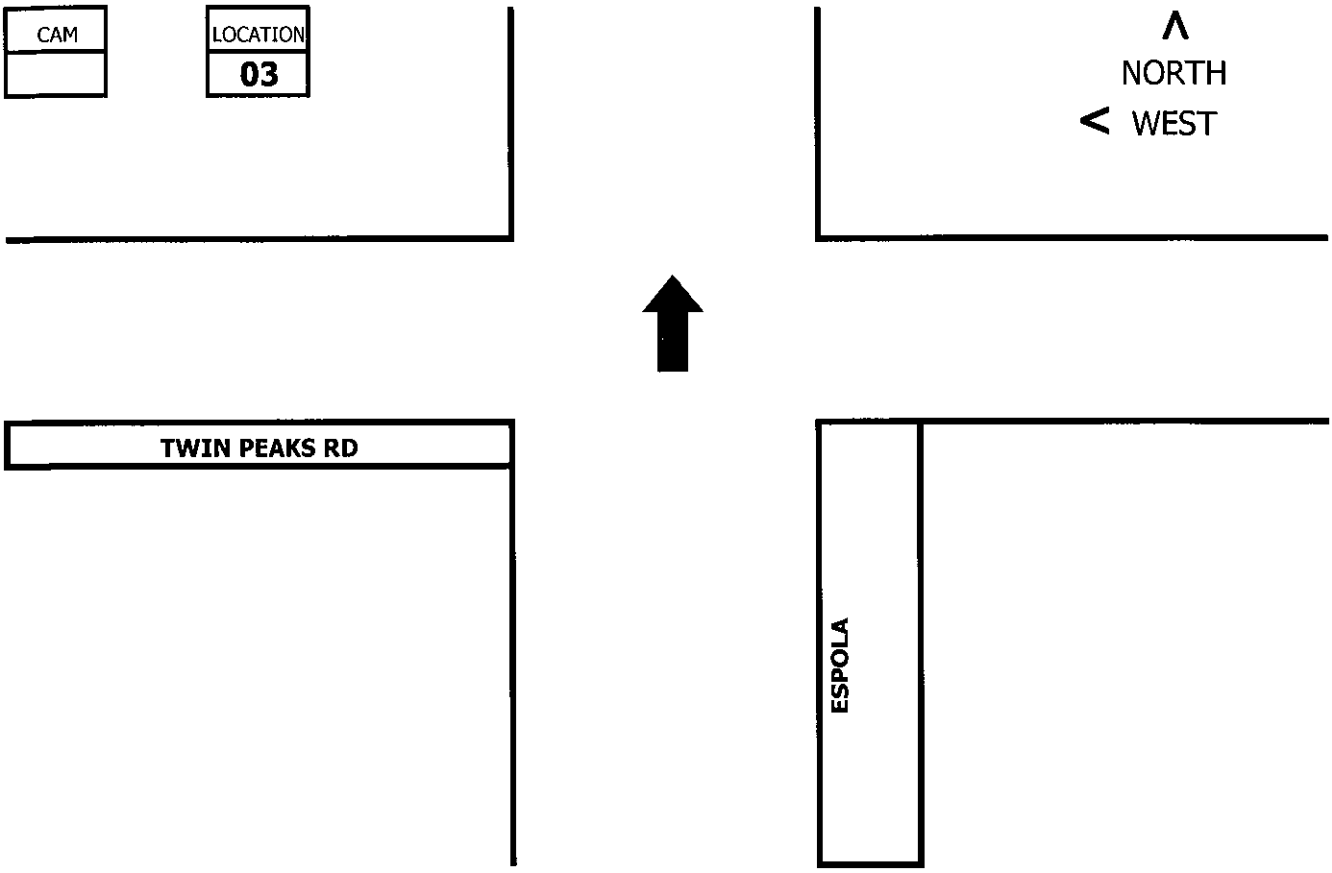
PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





CAM	LOCATION
	03



NORTH/SOUTH STREET	ESPOLA
EAST/WEST STREET	TWIN PEAKS RD

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
0700												
1600												

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Appendix D

Existing Synchro Worksheets

8451 Miralani Dr., Suite A • San Diego, CA 92126 • (858) 560-4911 • Fax (858) 560-9734

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	408	822	135	947	14	527	20	114	33	31	8
Future Volume (vph)	5	408	822	135	947	14	527	20	114	33	31	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	10	10	10
Total Lost time (s)	3.5	5.3	3.5	3.5	5.3		3.5	4.5	4.5	3.5	3.5	3.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3532		3433	1863	1583	1652	1739	1478
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3532		3433	1863	1583	1652	1739	1478
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	443	893	147	1029	15	573	22	124	36	34	9
RTOR Reduction (vph)	0	0	314	0	1	0	0	0	68	0	0	7
Lane Group Flow (vph)	5	443	579	147	1043	0	573	22	56	36	34	2
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	0.9	41.2	82.7	16.0	56.3		41.5	67.5	67.5	8.5	35.5	35.5
Effective Green, g (s)	0.9	41.2	82.7	16.0	56.3		41.5	67.5	67.5	8.5	35.5	35.5
Actuated g/C Ratio	0.01	0.27	0.55	0.11	0.38		0.28	0.45	0.45	0.06	0.24	0.24
Clearance Time (s)	3.5	5.3	3.5	3.5	5.3		3.5	4.5	4.5	3.5	3.5	3.5
Vehicle Extension (s)	2.0	3.5	2.0	2.0	3.5		2.0	3.5	3.5	2.0	2.0	2.0
Lane Grp Cap (vph)	10	972	872	188	1325		949	838	712	93	411	349
v/s Ratio Prot	0.00	0.13	c0.18	c0.08	c0.30		0.17	0.01		0.02	c0.02	
v/s Ratio Perm			0.18						0.04			0.00
v/c Ratio	0.50	0.46	0.66	0.78	0.79		0.60	0.03	0.08	0.39	0.08	0.01
Uniform Delay, d1	74.3	45.1	23.8	65.3	41.5		47.1	23.0	23.5	68.2	44.6	43.8
Progression Factor	1.00	1.00	1.00	1.21	0.88		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.6	1.5	4.0	15.2	4.1		2.8	0.1	0.2	11.7	0.4	0.0
Delay (s)	87.9	46.6	27.8	94.1	40.6		50.0	23.0	23.7	80.0	45.0	43.8
Level of Service	F	D	C	F	D		D	C	C	E	D	D
Approach Delay (s)		34.2			47.2			44.6			60.8	
Approach LOS		C			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	41.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	71.7%	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 (vph)	21	600	72	121	1183	29	84	9	124	55	18	42
Future Volume (vph)	21	600	72	121	1183	29	84	9	124	55	18	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.5	6.5		4.5	6.5		3.5	5.4	5.4	3.5	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3482		1770	3526		1770	1863	1583	1770	1668	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3482		1770	3526		1770	1863	1583	1770	1668	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	652	78	132	1286	32	91	10	135	60	20	46
RTOR Reduction (vph)	0	4	0	0	1	0	0	0	119	0	41	0
Lane Group Flow (vph)	23	726	0	132	1317	0	91	10	16	60	25	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	4.5	88.4		15.5	99.4		11.6	18.2	18.2	8.0	15.0	
Effective Green, g (s)	4.5	88.4		15.5	99.4		11.6	18.2	18.2	8.0	15.0	
Actuated g/C Ratio	0.03	0.59		0.10	0.66		0.08	0.12	0.12	0.05	0.10	
Clearance Time (s)	4.5	6.5		4.5	6.5		3.5	5.4	5.4	3.5	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	53	2052		182	2336		136	226	192	94	166	
v/s Ratio Prot	0.01	0.21		c0.07	c0.37		c0.05	0.01		0.03	c0.01	
v/s Ratio Perm									0.01			
v/c Ratio	0.43	0.35		0.73	0.56		0.67	0.04	0.09	0.64	0.15	
Uniform Delay, d1	71.5	16.0		65.2	13.6		67.3	58.2	58.5	69.6	61.7	
Progression Factor	0.74	2.32		0.65	1.87		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	0.5		10.5	0.3		9.3	0.0	0.1	10.0	0.2	
Delay (s)	54.9	37.5		53.0	25.8		76.6	58.2	58.6	79.6	61.8	
Level of Service	D	D		D	C		E	E	E	E	E	
Approach Delay (s)		38.0			28.3			65.5			70.3	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	61.8%	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 (vph)	52	713	2	2	1307	7	10	1	4	5	0	12
Future Volume (vph)	52	713	2	2	1307	7	10	1	4	5	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	16	12
Total Lost time (s)	4.5	4.0		4.5	6.3			4.5			4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (prot)	2006	4010		2006	4008			1972			2006	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.86			0.75	1.00
Satd. Flow (perm)	2006	4010		2006	4008			1746			1577	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	775	2	2	1421	8	11	1	4	5	0	13
RTOR Reduction (vph)	0	0	0	0	0	0	0	4	0	0	0	12
Lane Group Flow (vph)	57	777	0	2	1429	0	0	12	0	0	5	1
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		4
Actuated Green, G (s)	7.6	120.0		1.1	111.2			15.9			15.9	15.9
Effective Green, g (s)	7.6	120.0		1.1	111.2			15.9			15.9	15.9
Actuated g/C Ratio	0.05	0.80		0.01	0.74			0.11			0.11	0.11
Clearance Time (s)	4.5	4.0		4.5	6.3			4.5			4.5	4.5
Vehicle Extension (s)	2.0	3.5		2.0	3.5			2.0			2.0	2.0
Lane Grp Cap (vph)	101	3208		14	2971			185			167	167
v/s Ratio Prot	c0.03	0.19		0.00	c0.36							
v/s Ratio Perm								c0.01			0.00	0.00
v/c Ratio	0.56	0.24		0.14	0.48			0.07			0.03	0.01
Uniform Delay, d1	69.6	3.7		74.0	7.8			60.4			60.1	60.0
Progression Factor	1.55	0.13		0.95	0.62			1.00			1.00	1.00
Incremental Delay, d2	4.1	0.2		1.4	0.1			0.1			0.0	0.0
Delay (s)	111.8	0.6		72.0	5.0			60.4			60.2	60.0
Level of Service	F	A		E	A			E			E	E
Approach Delay (s)		8.2			5.0			60.4			60.0	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	57.8%	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 (vph)	224	409	105	31	925	109	86	150	24	103	31	298
Future Volume (vph)	224	409	105	31	925	109	86	150	24	103	31	298
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6	6.1		3.6	6.1		3.6	5.3		3.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2006	3888		2006	3948		2006	2068		2006	1825	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	2006	3888		2006	3948		2006	2068		2006	1825	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	243	445	114	34	1005	118	93	163	26	112	34	324
RTOR Reduction (vph)	0	12	0	0	5	0	0	4	0	0	257	0
Lane Group Flow (vph)	243	547	0	34	1118	0	93	185	0	112	101	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	21.4	89.2		5.2	73.0		10.5	25.4		11.6	27.2	
Effective Green, g (s)	21.4	89.2		5.2	73.0		10.5	25.4		11.6	27.2	
Actuated g/C Ratio	0.14	0.59		0.03	0.49		0.07	0.17		0.08	0.18	
Clearance Time (s)	3.6	6.1		3.6	6.1		3.6	5.3		3.6	4.6	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	286	2312		69	1921		140	350		155	330	
v/s Ratio Prot	c0.12	0.14		0.02	c0.28		0.05	c0.09		c0.06	0.06	
v/s Ratio Perm												
v/c Ratio	0.85	0.24		0.49	0.58		0.66	0.53		0.72	0.31	
Uniform Delay, d1	62.7	14.3		71.1	27.6		68.0	56.8		67.6	53.2	
Progression Factor	1.37	0.53		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.4	0.2		2.0	0.5		8.8	0.7		13.1	0.2	
Delay (s)	105.7	7.8		73.1	28.1		76.9	57.5		80.8	53.4	
Level of Service	F	A		E	C		E	E		F	D	
Approach Delay (s)		37.5			29.4			63.9			59.9	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	40.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.6
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
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)	24	470	3	11	1053	1	1	0	9	2	0	27
Future Volume (Veh/h)	24	470	3	11	1053	1	1	0	9	2	0	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	511	3	12	1145	1	1	0	10	2	0	29
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		553			732							
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	1146			514			1190	1734	257	1487	1736	573
vC1, stage 1 conf vol							564	564		1170	1170	
vC2, stage 2 conf vol							626	1170		318	566	
vCu, unblocked vol	1146			404			1110	1678	135	1420	1679	573
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			100	100	99	99	100	94
cM capacity (veh/h)	605			1103			324	218	851	195	237	463

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	26	341	173	12	763	383	11	31
Volume Left	26	0	0	12	0	0	1	2
Volume Right	0	0	3	0	0	1	10	29
cSH	605	1700	1700	1103	1700	1700	741	425
Volume to Capacity	0.04	0.20	0.10	0.01	0.45	0.23	0.01	0.07
Queue Length 95th (ft)	3	0	0	1	0	0	1	6
Control Delay (s)	11.2	0.0	0.0	8.3	0.0	0.0	9.9	14.1
Lane LOS	B			A			A	B
Approach Delay (s)	0.5			0.1			9.9	14.1
Approach LOS							A	B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	321	33	159	9	53	38	495	375	4	21	279	510
Future Volume (vph)	321	33	159	9	53	38	495	375	4	21	279	510
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	16	12	12	12	12	12	12	12
Total Lost time (s)	4.2	6.1	4.2	3.6	4.6		4.2	6.0	6.0	3.6	6.2	4.2
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3204	1863	1583	1652	1980		3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3204	1863	1583	1652	1980		3433	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	349	36	173	10	58	41	538	408	4	23	303	554
RTOR Reduction (vph)	0	0	101	0	26	0	0	0	2	0	0	263
Lane Group Flow (vph)	349	36	72	10	73	0	538	408	2	23	303	291
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2		1	6	7
Permitted Phases			4						2			6
Actuated Green, G (s)	14.8	25.2	42.2	1.0	12.3		17.0	54.2	54.2	2.4	38.8	53.6
Effective Green, g (s)	14.8	25.2	42.2	1.0	12.3		17.0	54.2	54.2	2.4	38.8	53.6
Actuated g/C Ratio	0.14	0.25	0.41	0.01	0.12		0.17	0.53	0.53	0.02	0.38	0.52
Clearance Time (s)	4.2	6.1	4.2	3.6	4.6		4.2	6.0	6.0	3.6	6.2	4.2
Vehicle Extension (s)	3.0	3.5	2.0	2.0	2.0		2.0	3.5	3.5	2.0	3.5	3.0
Lane Grp Cap (vph)	464	459	654	16	238		571	988	840	41	707	831
v/s Ratio Prot	c0.11	0.02	0.02	0.01	c0.04		c0.16	c0.22		0.01	0.16	0.05
v/s Ratio Perm			0.03						0.00			0.13
v/c Ratio	0.75	0.08	0.11	0.62	0.31		0.94	0.41	0.00	0.56	0.43	0.35
Uniform Delay, d1	41.9	29.5	18.4	50.4	41.0		42.1	14.4	11.3	49.3	23.4	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.8	0.1	0.0	44.0	0.3		23.9	1.3	0.0	10.0	1.9	0.3
Delay (s)	48.7	29.6	18.4	94.4	41.3		66.0	15.7	11.3	59.4	25.3	14.4
Level of Service	D	C	B	F	D		E	B	B	E	C	B
Approach Delay (s)		38.1			46.2			44.1			19.3	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	102.1	Sum of lost time (s)	20.1
Intersection Capacity Utilization	63.2%	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 (vph)	24	999	811	169	503	18	922	56	170	23	44	12
Future Volume (vph)	24	999	811	169	503	18	922	56	170	23	44	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	10	10	10
Total Lost time (s)	3.5	5.3	3.5	3.5	5.3		3.5	4.5	4.5	3.5	3.5	3.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3520		3433	1863	1583	1652	1739	1478
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3520		3433	1863	1583	1652	1739	1478
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	1086	882	184	547	20	1002	61	185	25	48	13
RTOR Reduction (vph)	0	0	290	0	2	0	0	0	101	0	0	10
Lane Group Flow (vph)	26	1086	592	184	565	0	1002	61	84	25	48	3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	3.3	43.7	84.2	14.5	54.9		40.5	68.5	68.5	6.5	35.5	35.5
Effective Green, g (s)	3.3	43.7	84.2	14.5	54.9		40.5	68.5	68.5	6.5	35.5	35.5
Actuated g/C Ratio	0.02	0.29	0.56	0.10	0.37		0.27	0.46	0.46	0.04	0.24	0.24
Clearance Time (s)	3.5	5.3	3.5	3.5	5.3		3.5	4.5	4.5	3.5	3.5	3.5
Vehicle Extension (s)	2.0	3.5	2.0	2.0	3.5		2.0	3.5	3.5	2.0	2.0	2.0
Lane Grp Cap (vph)	38	1031	888	171	1288		926	850	722	71	411	349
v/s Ratio Prot	0.01	c0.31	0.18	c0.10	0.16		c0.29	0.03		0.02	0.03	
v/s Ratio Perm			0.19						c0.05			0.00
v/c Ratio	0.68	1.05	0.67	1.08	0.44		1.08	0.07	0.12	0.35	0.12	0.01
Uniform Delay, d1	72.8	53.1	23.1	67.8	35.9		54.8	22.9	23.4	69.7	44.9	43.8
Progression Factor	1.00	1.00	1.00	1.05	0.94		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.5	43.2	4.0	87.9	1.0		54.3	0.2	0.3	13.2	0.6	0.0
Delay (s)	106.4	96.3	27.0	158.8	34.9		109.1	23.1	23.7	82.9	45.5	43.8
Level of Service	F	F	C	F	C		F	C	C	F	D	D
Approach Delay (s)		65.8			65.2			92.2			56.1	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	73.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	81.0%	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 (vph)	86	1185	158	139	627	13	138	23	162	23	20	78
Future Volume (vph)	86	1185	158	139	627	13	138	23	162	23	20	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.5	6.5		4.5	6.5		3.5	5.4	5.4	3.5	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3477		1770	3529		1770	1863	1583	1770	1641	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3477		1770	3529		1770	1863	1583	1770	1641	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1288	172	151	682	14	150	25	176	25	22	85
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	143	0	75	0
Lane Group Flow (vph)	93	1454	0	151	695	0	150	25	33	25	32	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	12.2	82.9		16.2	86.9		14.1	27.7	27.7	3.3	17.3	
Effective Green, g (s)	12.2	82.9		16.2	86.9		14.1	27.7	27.7	3.3	17.3	
Actuated g/C Ratio	0.08	0.55		0.11	0.58		0.09	0.18	0.18	0.02	0.12	
Clearance Time (s)	4.5	6.5		4.5	6.5		3.5	5.4	5.4	3.5	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	143	1921		191	2044		166	344	292	38	189	
v/s Ratio Prot	0.05	c0.42		c0.09	c0.20		c0.08	0.01		0.01	c0.02	
v/s Ratio Perm									0.02			
v/c Ratio	0.65	0.76		0.79	0.34		0.90	0.07	0.11	0.66	0.17	
Uniform Delay, d1	66.8	25.8		65.2	16.5		67.3	50.5	50.9	72.8	59.9	
Progression Factor	0.66	2.25		0.71	1.56		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.9	1.8		18.0	0.1		42.2	0.0	0.1	27.1	0.2	
Delay (s)	49.2	59.8		64.1	25.9		109.5	50.6	51.0	99.9	60.0	
Level of Service	D	E		E	C		F	D	D	F	E	
Approach Delay (s)		59.1			32.7			76.0			67.6	
Approach LOS		E			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	53.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	73.5%	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 (vph)	103	1241	7	0	717	53	1	1	1	24	0	43
Future Volume (vph)	103	1241	7	0	717	53	1	1	1	24	0	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	16	12
Total Lost time (s)	4.5	4.0			6.3			4.5			4.5	4.5
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	1.00
Frt	1.00	1.00			0.99			0.95			1.00	0.85
Flt Protected	0.95	1.00			1.00			0.98			0.95	1.00
Satd. Flow (prot)	2006	4008			3969			1983			2006	1583
Flt Permitted	0.95	1.00			1.00			0.96			0.76	1.00
Satd. Flow (perm)	2006	4008			3969			1926			1596	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	1349	8	0	779	58	1	1	1	26	0	47
RTOR Reduction (vph)	0	0	0	0	2	0	0	1	0	0	0	42
Lane Group Flow (vph)	112	1357	0	0	835	0	0	2	0	0	26	5
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		4
Actuated Green, G (s)	12.8	124.2			104.6			17.3			17.3	17.3
Effective Green, g (s)	12.8	124.2			104.6			17.3			17.3	17.3
Actuated g/C Ratio	0.09	0.83			0.70			0.12			0.12	0.12
Clearance Time (s)	4.5	4.0			6.3			4.5			4.5	4.5
Vehicle Extension (s)	2.0	3.5			3.5			2.0			2.0	2.0
Lane Grp Cap (vph)	171	3318			2767			222			184	182
v/s Ratio Prot	c0.06	c0.34			0.21							
v/s Ratio Perm								0.00			c0.02	0.00
v/c Ratio	0.65	0.41			0.30			0.01			0.14	0.03
Uniform Delay, d1	66.5	3.4			8.7			58.8			59.7	58.9
Progression Factor	1.48	0.08			0.53			1.00			1.00	1.00
Incremental Delay, d2	4.9	0.3			0.1			0.0			0.1	0.0
Delay (s)	103.3	0.5			4.7			58.8			59.8	58.9
Level of Service	F	A			A			E			E	E
Approach Delay (s)		8.4			4.7			58.8			59.2	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	52.0%	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 (vph)	183	1005	87	31	602	35	45	23	32	34	14	100
Future Volume (vph)	183	1005	87	31	602	35	45	23	32	34	14	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6	6.1		3.6	6.1		3.6	5.3		3.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2006	3963		2006	3978		2006	1926		2006	1833	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	2006	3963		2006	3978		2006	1926		2006	1833	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	199	1092	95	34	654	38	49	25	35	37	15	109
RTOR Reduction (vph)	0	3	0	0	2	0	0	30	0	0	94	0
Lane Group Flow (vph)	199	1184	0	34	690	0	49	30	0	37	30	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	19.2	98.2		6.2	85.2		6.9	20.8		6.2	20.8	
Effective Green, g (s)	19.2	98.2		6.2	85.2		6.9	20.8		6.2	20.8	
Actuated g/C Ratio	0.13	0.65		0.04	0.57		0.05	0.14		0.04	0.14	
Clearance Time (s)	3.6	6.1		3.6	6.1		3.6	5.3		3.6	4.6	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	256	2594		82	2259		92	267		82	254	
v/s Ratio Prot	c0.10	c0.30		0.02	0.17		c0.02	0.02		0.02	c0.02	
v/s Ratio Perm												
v/c Ratio	0.78	0.46		0.41	0.31		0.53	0.11		0.45	0.12	
Uniform Delay, d1	63.3	12.8		70.1	16.9		70.0	56.5		70.2	56.6	
Progression Factor	1.03	1.16		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.9	0.5		1.2	0.1		2.9	0.1		1.4	0.1	
Delay (s)	77.4	15.4		71.4	17.0		72.9	56.6		71.7	56.6	
Level of Service	E	B		E	B		E	E		E	E	
Approach Delay (s)		24.3			19.6			63.9			60.1	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.6
Intersection Capacity Utilization	57.5%	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)	36	990	1	6	576	2	2	1	2	1	0	23
Future Volume (Veh/h)	36	990	1	6	576	2	2	1	2	1	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	1076	1	7	626	2	2	1	2	1	0	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		553			732							
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	628			1077			1506	1796	538	1260	1796	314
vC1, stage 1 conf vol							1154	1154		641	641	
vC2, stage 2 conf vol							352	642		618	1155	
vCu, unblocked vol	628			746			1249	1589	115	960	1589	314
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			99	100	100	100	100	96
cM capacity (veh/h)	950			732			248	258	781	374	260	682

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	39	717	360	7	417	211	5	26
Volume Left	39	0	0	7	0	0	2	1
Volume Right	0	0	1	0	0	2	2	25
cSH	950	1700	1700	732	1700	1700	345	661
Volume to Capacity	0.04	0.42	0.21	0.01	0.25	0.12	0.01	0.04
Queue Length 95th (ft)	3	0	0	1	0	0	1	3
Control Delay (s)	9.0	0.0	0.0	10.0	0.0	0.0	15.6	10.7
Lane LOS	A			A			C	B
Approach Delay (s)	0.3			0.1			15.6	10.7
Approach LOS							C	B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	454	49	477	13	29	19	264	277	20	12	366	310
Future Volume (vph)	454	49	477	13	29	19	264	277	20	12	366	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	16	12	12	12	12	12	12	12
Total Lost time (s)	4.2	6.1	4.2	3.6	4.6		4.2	6.0	6.0	3.6	6.2	4.2
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3204	1863	1583	1652	1986		3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3204	1863	1583	1652	1986		3433	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	493	53	518	14	32	21	287	301	22	13	398	337
RTOR Reduction (vph)	0	0	169	0	19	0	0	0	11	0	0	137
Lane Group Flow (vph)	493	53	349	14	34	0	287	301	11	13	398	200
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2		1	6	7
Permitted Phases			4						2			6
Actuated Green, G (s)	19.2	27.3	38.7	1.0	10.0		11.4	51.4	51.4	1.0	40.2	59.4
Effective Green, g (s)	19.2	27.3	38.7	1.0	10.0		11.4	51.4	51.4	1.0	40.2	59.4
Actuated g/C Ratio	0.19	0.27	0.39	0.01	0.10		0.11	0.51	0.51	0.01	0.40	0.59
Clearance Time (s)	4.2	6.1	4.2	3.6	4.6		4.2	6.0	6.0	3.6	6.2	4.2
Vehicle Extension (s)	3.0	3.5	2.0	2.0	2.0		2.0	3.5	3.5	2.0	3.5	3.0
Lane Grp Cap (vph)	615	508	612	16	198		391	957	813	17	748	940
v/s Ratio Prot	c0.15	0.03	c0.07	0.01	0.02		c0.08	0.16		0.01	c0.21	0.04
v/s Ratio Perm			0.16						0.01			0.09
v/c Ratio	0.80	0.10	0.57	0.88	0.17		0.73	0.31	0.01	0.76	0.53	0.21
Uniform Delay, d1	38.6	27.2	24.1	49.4	41.2		42.8	14.1	11.9	49.4	22.7	9.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	0.1	0.8	158.2	0.2		6.0	0.9	0.0	99.4	2.7	0.1
Delay (s)	46.0	27.3	24.9	207.7	41.4		48.9	14.9	11.9	148.8	25.4	9.5
Level of Service	D	C	C	F	D		D	B	B	F	C	A
Approach Delay (s)		34.8			76.1			30.8			20.4	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.1
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Appendix E

Existing With Project Synchro Worksheets

8451 Miralani Dr., Suite A • San Diego, CA 92126 • (858) 560-4911 • Fax (858) 560-9734

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	410	822	139	955	14	527	20	115	33	31	0
Future Volume (vph)	5	410	822	139	955	14	527	20	115	33	31	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	10	10	10
Total Lost time (s)	3.5	5.3	3.5	3.5	5.3		3.5	4.5	4.5	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3532		3433	1863	1583	1652	1739	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3532		3433	1863	1583	1652	1739	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	446	893	151	1038	15	573	22	125	36	34	0
RTOR Reduction (vph)	0	0	314	0	1	0	0	0	70	0	0	0
Lane Group Flow (vph)	5	446	579	151	1052	0	573	22	55	36	34	0
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	0.9	41.7	82.2	16.5	57.3		40.5	66.5	66.5	8.5	35.5	
Effective Green, g (s)	0.9	41.7	82.2	16.5	57.3		40.5	66.5	66.5	8.5	35.5	
Actuated g/C Ratio	0.01	0.28	0.55	0.11	0.38		0.27	0.44	0.44	0.06	0.24	
Clearance Time (s)	3.5	5.3	3.5	3.5	5.3		3.5	4.5	4.5	3.5	3.5	
Vehicle Extension (s)	2.0	3.5	2.0	2.0	3.5		2.0	3.5	3.5	2.0	2.0	
Lane Grp Cap (vph)	10	983	867	194	1349		926	825	701	93	411	
v/s Ratio Prot	0.00	0.13	c0.18	c0.09	c0.30		0.17	0.01		0.02	c0.02	
v/s Ratio Perm			0.19						0.04			
v/c Ratio	0.50	0.45	0.67	0.78	0.78		0.62	0.03	0.08	0.39	0.08	
Uniform Delay, d1	74.3	44.7	24.2	65.0	40.8		48.0	23.5	24.1	68.2	44.6	
Progression Factor	1.00	1.00	1.00	1.21	0.88		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.6	1.5	4.1	14.1	3.9		3.1	0.1	0.2	11.7	0.4	
Delay (s)	87.9	46.3	28.2	92.9	39.7		51.1	23.6	24.3	80.0	45.0	
Level of Service	F	D	C	F	D		D	C	C	E	D	
Approach Delay (s)		34.4			46.4			45.6			63.0	
Approach LOS		C			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	71.9%	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 (vph)	21	603	72	121	1194	29	84	9	124	55	18	42
Future Volume (vph)	21	603	72	121	1194	29	84	9	124	55	18	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.5	6.5		4.5	6.5		3.5	5.4	5.4	3.5	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3483		1770	3526		1770	1863	1583	1770	1668	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3483		1770	3526		1770	1863	1583	1770	1668	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	655	78	132	1298	32	91	10	135	60	20	46
RTOR Reduction (vph)	0	4	0	0	1	0	0	0	119	0	41	0
Lane Group Flow (vph)	23	729	0	132	1329	0	91	10	16	60	25	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	4.5	88.4		15.5	99.4		11.6	18.2	18.2	8.0	15.0	
Effective Green, g (s)	4.5	88.4		15.5	99.4		11.6	18.2	18.2	8.0	15.0	
Actuated g/C Ratio	0.03	0.59		0.10	0.66		0.08	0.12	0.12	0.05	0.10	
Clearance Time (s)	4.5	6.5		4.5	6.5		3.5	5.4	5.4	3.5	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	53	2052		182	2336		136	226	192	94	166	
v/s Ratio Prot	0.01	0.21		c0.07	c0.38		c0.05	0.01		0.03	c0.01	
v/s Ratio Perm									0.01			
v/c Ratio	0.43	0.36		0.73	0.57		0.67	0.04	0.09	0.64	0.15	
Uniform Delay, d1	71.5	16.0		65.2	13.7		67.3	58.2	58.5	69.6	61.7	
Progression Factor	0.73	2.32		0.65	1.87		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	0.5		10.4	0.3		9.3	0.0	0.1	10.0	0.2	
Delay (s)	54.5	37.6		53.0	26.0		76.6	58.2	58.6	79.6	61.8	
Level of Service	D	D		D	C		E	E	E	E	E	
Approach Delay (s)		38.1			28.4			65.5			70.3	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	62.1%	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 (vph)	52	716	2	2	1318	7	10	1	4	5	0	12
Future Volume (vph)	52	716	2	2	1318	7	10	1	4	5	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	16	12
Total Lost time (s)	4.5	4.0		4.5	6.3			4.5			4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (prot)	2006	4010		2006	4008			1972			2006	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.86			0.75	1.00
Satd. Flow (perm)	2006	4010		2006	4008			1746			1577	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	778	2	2	1433	8	11	1	4	5	0	13
RTOR Reduction (vph)	0	0	0	0	0	0	0	4	0	0	0	12
Lane Group Flow (vph)	57	780	0	2	1441	0	0	12	0	0	5	1
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		4
Actuated Green, G (s)	7.6	120.0		1.1	111.2			15.9			15.9	15.9
Effective Green, g (s)	7.6	120.0		1.1	111.2			15.9			15.9	15.9
Actuated g/C Ratio	0.05	0.80		0.01	0.74			0.11			0.11	0.11
Clearance Time (s)	4.5	4.0		4.5	6.3			4.5			4.5	4.5
Vehicle Extension (s)	2.0	3.5		2.0	3.5			2.0			2.0	2.0
Lane Grp Cap (vph)	101	3208		14	2971			185			167	167
v/s Ratio Prot	c0.03	0.19		0.00	c0.36							
v/s Ratio Perm								c0.01			0.00	0.00
v/c Ratio	0.56	0.24		0.14	0.48			0.07			0.03	0.01
Uniform Delay, d1	69.6	3.7		74.0	7.8			60.4			60.1	60.0
Progression Factor	1.55	0.13		0.96	0.63			1.00			1.00	1.00
Incremental Delay, d2	4.1	0.2		1.4	0.1			0.1			0.0	0.0
Delay (s)	111.7	0.6		72.3	5.1			60.4			60.2	60.0
Level of Service	F	A		E	A			E			E	E
Approach Delay (s)		8.2			5.2			60.4			60.0	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	57.8%	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 (vph)	224	412	105	31	936	109	86	150	24	103	31	298
Future Volume (vph)	224	412	105	31	936	109	86	150	24	103	31	298
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6	6.1		3.6	6.1		3.6	5.3		3.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2006	3889		2006	3949		2006	2068		2006	1825	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	2006	3889		2006	3949		2006	2068		2006	1825	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	243	448	114	34	1017	118	93	163	26	112	34	324
RTOR Reduction (vph)	0	11	0	0	5	0	0	4	0	0	261	0
Lane Group Flow (vph)	243	551	0	34	1130	0	93	185	0	112	97	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	21.9	87.5		5.8	71.4		11.3	25.4		12.7	27.5	
Effective Green, g (s)	21.9	87.5		5.8	71.4		11.3	25.4		12.7	27.5	
Actuated g/C Ratio	0.15	0.58		0.04	0.48		0.08	0.17		0.08	0.18	
Clearance Time (s)	3.6	6.1		3.6	6.1		3.6	5.3		3.6	4.6	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	292	2268		77	1879		151	350		169	334	
v/s Ratio Prot	c0.12	0.14		0.02	c0.29		0.05	c0.09		c0.06	0.05	
v/s Ratio Perm												
v/c Ratio	0.83	0.24		0.44	0.60		0.62	0.53		0.66	0.29	
Uniform Delay, d1	62.3	15.2		70.5	28.9		67.2	56.8		66.6	52.8	
Progression Factor	1.32	0.69		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.1	0.3		1.5	0.6		5.2	0.7		7.3	0.2	
Delay (s)	99.5	10.7		72.0	29.4		72.4	57.5		73.9	53.0	
Level of Service	F	B		E	C		E	E		E	D	
Approach Delay (s)		37.5			30.7			62.4			58.0	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	40.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.6
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
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)	24	473	3	11	1064	1	1	0	9	2	0	27
Future Volume (Veh/h)	24	473	3	11	1064	1	1	0	9	2	0	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	514	3	12	1157	1	1	0	10	2	0	29
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		553			732							
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	1158			517			1199	1750	258	1500	1750	579
vC1, stage 1 conf vol							568	568		1182	1182	
vC2, stage 2 conf vol							632	1182		319	569	
vCu, unblocked vol	1158			399			1114	1690	129	1430	1691	579
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			100	100	99	99	100	94
cM capacity (veh/h)	599			1103			322	216	857	192	234	458

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	26	343	174	12	771	387	11	31
Volume Left	26	0	0	12	0	0	1	2
Volume Right	0	0	3	0	0	1	10	29
cSH	599	1700	1700	1103	1700	1700	744	421
Volume to Capacity	0.04	0.20	0.10	0.01	0.45	0.23	0.01	0.07
Queue Length 95th (ft)	3	0	0	1	0	0	1	6
Control Delay (s)	11.3	0.0	0.0	8.3	0.0	0.0	9.9	14.2
Lane LOS	B			A			A	B
Approach Delay (s)	0.5			0.1			9.9	14.2
Approach LOS							A	B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	322	33	160	9	53	38	495	375	4	21	279	510
Future Volume (vph)	322	33	160	9	53	38	495	375	4	21	279	510
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	16	12	12	12	12	12	12	12
Total Lost time (s)	4.2	6.1	4.2	3.6	4.6		4.2	6.0	6.0	3.6	6.2	4.2
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3204	1863	1583	1652	1980		3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3204	1863	1583	1652	1980		3433	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	350	36	174	10	58	41	538	408	4	23	303	554
RTOR Reduction (vph)	0	0	102	0	26	0	0	0	2	0	0	263
Lane Group Flow (vph)	350	36	72	10	73	0	538	408	2	23	303	291
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2		1	6	7
Permitted Phases			4						2			6
Actuated Green, G (s)	14.9	25.3	42.3	1.0	12.3		17.0	54.2	54.2	2.4	38.8	53.7
Effective Green, g (s)	14.9	25.3	42.3	1.0	12.3		17.0	54.2	54.2	2.4	38.8	53.7
Actuated g/C Ratio	0.15	0.25	0.41	0.01	0.12		0.17	0.53	0.53	0.02	0.38	0.53
Clearance Time (s)	4.2	6.1	4.2	3.6	4.6		4.2	6.0	6.0	3.6	6.2	4.2
Vehicle Extension (s)	3.0	3.5	2.0	2.0	2.0		2.0	3.5	3.5	2.0	3.5	3.0
Lane Grp Cap (vph)	467	461	655	16	238		571	988	839	41	707	831
v/s Ratio Prot	c0.11	0.02	0.02	0.01	c0.04		c0.16	c0.22		0.01	0.16	0.05
v/s Ratio Perm			0.03						0.00			0.13
v/c Ratio	0.75	0.08	0.11	0.62	0.31		0.94	0.41	0.00	0.56	0.43	0.35
Uniform Delay, d1	41.9	29.5	18.4	50.4	41.1		42.1	14.4	11.3	49.4	23.5	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.5	0.1	0.0	44.0	0.3		23.9	1.3	0.0	10.0	1.9	0.3
Delay (s)	48.4	29.6	18.4	94.4	41.3		66.0	15.7	11.3	59.4	25.4	14.4
Level of Service	D	C	B	F	D		E	B	B	E	C	B
Approach Delay (s)		37.8			46.2			44.2			19.3	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	102.2	Sum of lost time (s)	20.1
Intersection Capacity Utilization	63.2%	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 (vph)	24	1007	811	171	506	18	922	56	174	23	44	0
Future Volume (vph)	24	1007	811	171	506	18	922	56	174	23	44	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	10	10	10
Total Lost time (s)	3.5	5.3	3.5	3.5	5.3		3.5	4.5	4.5	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3521		3433	1863	1583	1652	1739	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3521		3433	1863	1583	1652	1739	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	1095	882	186	550	20	1002	61	189	25	48	0
RTOR Reduction (vph)	0	0	289	0	2	0	0	0	104	0	0	0
Lane Group Flow (vph)	26	1095	593	186	568	0	1002	61	85	25	48	0
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	3.3	44.7	84.2	14.5	55.9		39.5	67.5	67.5	6.5	35.5	
Effective Green, g (s)	3.3	44.7	84.2	14.5	55.9		39.5	67.5	67.5	6.5	35.5	
Actuated g/C Ratio	0.02	0.30	0.56	0.10	0.37		0.26	0.45	0.45	0.04	0.24	
Clearance Time (s)	3.5	5.3	3.5	3.5	5.3		3.5	4.5	4.5	3.5	3.5	
Vehicle Extension (s)	2.0	3.5	2.0	2.0	3.5		2.0	3.5	3.5	2.0	2.0	
Lane Grp Cap (vph)	38	1054	888	171	1312		904	838	712	71	411	
v/s Ratio Prot	0.01	c0.31	0.18	c0.11	0.16		c0.29	0.03		0.02	0.03	
v/s Ratio Perm			0.20						c0.05			
v/c Ratio	0.68	1.04	0.67	1.09	0.43		1.11	0.07	0.12	0.35	0.12	
Uniform Delay, d1	72.8	52.6	23.1	67.8	35.2		55.2	23.5	24.0	69.7	44.9	
Progression Factor	1.00	1.00	1.00	1.04	0.93		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.5	38.3	4.0	91.6	1.0		64.2	0.2	0.3	13.2	0.6	
Delay (s)	106.4	91.0	27.1	162.4	33.8		119.5	23.6	24.3	82.9	45.5	
Level of Service	F	F	C	F	C		F	C	C	F	D	
Approach Delay (s)		63.0			65.4			100.5			58.3	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	74.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	81.4%	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 (vph)	86	1197	158	139	632	13	138	23	162	23	20	78
Future Volume (vph)	86	1197	158	139	632	13	138	23	162	23	20	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.5	6.5		4.5	6.5		3.5	5.4	5.4	3.5	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3477		1770	3529		1770	1863	1583	1770	1641	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3477		1770	3529		1770	1863	1583	1770	1641	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1301	172	151	687	14	150	25	176	25	22	85
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	143	0	75	0
Lane Group Flow (vph)	93	1468	0	151	700	0	150	25	33	25	32	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	12.2	82.9		16.2	86.9		14.1	27.7	27.7	3.3	17.3	
Effective Green, g (s)	12.2	82.9		16.2	86.9		14.1	27.7	27.7	3.3	17.3	
Actuated g/C Ratio	0.08	0.55		0.11	0.58		0.09	0.18	0.18	0.02	0.12	
Clearance Time (s)	4.5	6.5		4.5	6.5		3.5	5.4	5.4	3.5	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	143	1921		191	2044		166	344	292	38	189	
v/s Ratio Prot	0.05	c0.42		c0.09	c0.20		c0.08	0.01		0.01	c0.02	
v/s Ratio Perm									0.02			
v/c Ratio	0.65	0.76		0.79	0.34		0.90	0.07	0.11	0.66	0.17	
Uniform Delay, d1	66.8	26.0		65.2	16.6		67.3	50.5	50.9	72.8	59.9	
Progression Factor	0.66	2.24		0.70	1.56		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.0	1.9		18.0	0.1		42.2	0.0	0.1	27.1	0.2	
Delay (s)	49.0	60.0		64.0	26.0		109.5	50.6	51.0	99.9	60.0	
Level of Service	D	E		E	C		F	D	D	F	E	
Approach Delay (s)		59.3			32.7			76.0			67.6	
Approach LOS		E			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	73.8%	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 (vph)	103	1253	7	0	722	53	1	1	1	24	0	43
Future Volume (vph)	103	1253	7	0	722	53	1	1	1	24	0	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	16	12
Total Lost time (s)	4.5	4.0			6.3			4.5			4.5	4.5
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	1.00
Frt	1.00	1.00			0.99			0.95			1.00	0.85
Flt Protected	0.95	1.00			1.00			0.98			0.95	1.00
Satd. Flow (prot)	2006	4008			3970			1983			2006	1583
Flt Permitted	0.95	1.00			1.00			0.96			0.76	1.00
Satd. Flow (perm)	2006	4008			3970			1926			1596	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	1362	8	0	785	58	1	1	1	26	0	47
RTOR Reduction (vph)	0	0	0	0	2	0	0	1	0	0	0	42
Lane Group Flow (vph)	112	1370	0	0	841	0	0	2	0	0	26	5
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		4
Actuated Green, G (s)	12.8	124.2			104.6			17.3			17.3	17.3
Effective Green, g (s)	12.8	124.2			104.6			17.3			17.3	17.3
Actuated g/C Ratio	0.09	0.83			0.70			0.12			0.12	0.12
Clearance Time (s)	4.5	4.0			6.3			4.5			4.5	4.5
Vehicle Extension (s)	2.0	3.5			3.5			2.0			2.0	2.0
Lane Grp Cap (vph)	171	3318			2768			222			184	182
v/s Ratio Prot	c0.06	c0.34			0.21							
v/s Ratio Perm								0.00			c0.02	0.00
v/c Ratio	0.65	0.41			0.30			0.01			0.14	0.03
Uniform Delay, d1	66.5	3.4			8.7			58.8			59.7	58.9
Progression Factor	1.47	0.09			0.56			1.00			1.00	1.00
Incremental Delay, d2	4.8	0.3			0.1			0.0			0.1	0.0
Delay (s)	102.8	0.6			4.9			58.8			59.8	58.9
Level of Service	F	A			A			E			E	E
Approach Delay (s)		8.3			4.9			58.8			59.2	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	52.4%	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 (vph)	183	1017	87	31	607	35	45	23	32	34	14	100
Future Volume (vph)	183	1017	87	31	607	35	45	23	32	34	14	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6	6.1		3.6	6.1		3.6	5.3		3.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2006	3963		2006	3978		2006	1926		2006	1833	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	2006	3963		2006	3978		2006	1926		2006	1833	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	199	1105	95	34	660	38	49	25	35	37	15	109
RTOR Reduction (vph)	0	3	0	0	2	0	0	30	0	0	94	0
Lane Group Flow (vph)	199	1197	0	34	696	0	49	30	0	37	30	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	19.2	98.1		6.2	85.1		7.1	20.8		6.3	20.7	
Effective Green, g (s)	19.2	98.1		6.2	85.1		7.1	20.8		6.3	20.7	
Actuated g/C Ratio	0.13	0.65		0.04	0.57		0.05	0.14		0.04	0.14	
Clearance Time (s)	3.6	6.1		3.6	6.1		3.6	5.3		3.6	4.6	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	256	2591		82	2256		94	267		84	252	
v/s Ratio Prot	c0.10	c0.30		0.02	0.18		c0.02	0.02		0.02	c0.02	
v/s Ratio Perm												
v/c Ratio	0.78	0.46		0.41	0.31		0.52	0.11		0.44	0.12	
Uniform Delay, d1	63.3	12.9		70.1	17.0		69.8	56.5		70.1	56.7	
Progression Factor	1.03	1.18		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.9	0.6		1.2	0.1		2.4	0.1		1.3	0.1	
Delay (s)	76.9	15.8		71.4	17.1		72.2	56.6		71.5	56.7	
Level of Service	E	B		E	B		E	E		E	E	
Approach Delay (s)		24.5			19.6			63.6			60.1	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.6
Intersection Capacity Utilization	57.9%	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)	36	1002	1	6	581	2	2	1	2	1	0	23
Future Volume (Veh/h)	36	1002	1	6	581	2	2	1	2	1	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	1089	1	7	632	2	2	1	2	1	0	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		553			732							
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	634			1090			1522	1816	545	1272	1815	317
vC1, stage 1 conf vol							1168	1168		647	647	
vC2, stage 2 conf vol							355	648		625	1168	
vCu, unblocked vol	634			754			1263	1607	113	968	1607	317
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			99	100	100	100	100	96
cM capacity (veh/h)	945			724			244	254	781	371	256	679

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	39	726	364	7	421	213	5	26
Volume Left	39	0	0	7	0	0	2	1
Volume Right	0	0	1	0	0	2	2	25
cSH	945	1700	1700	724	1700	1700	340	658
Volume to Capacity	0.04	0.43	0.21	0.01	0.25	0.13	0.01	0.04
Queue Length 95th (ft)	3	0	0	1	0	0	1	3
Control Delay (s)	9.0	0.0	0.0	10.0	0.0	0.0	15.7	10.7
Lane LOS	A			B			C	B
Approach Delay (s)	0.3			0.1			15.7	10.7
Approach LOS							C	B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	455	49	478	13	29	19	265	277	20	12	366	311
Future Volume (vph)	455	49	478	13	29	19	265	277	20	12	366	311
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	16	12	12	12	12	12	12	12
Total Lost time (s)	4.2	6.1	4.2	3.6	4.6		4.2	6.0	6.0	3.6	6.2	4.2
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3204	1863	1583	1652	1986		3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3204	1863	1583	1652	1986		3433	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	495	53	520	14	32	21	288	301	22	13	398	338
RTOR Reduction (vph)	0	0	168	0	19	0	0	0	11	0	0	137
Lane Group Flow (vph)	495	53	352	14	34	0	288	301	11	13	398	201
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2		1	6	7
Permitted Phases			4						2			6
Actuated Green, G (s)	19.3	27.4	38.9	1.0	10.0		11.5	51.4	51.4	1.0	40.1	59.4
Effective Green, g (s)	19.3	27.4	38.9	1.0	10.0		11.5	51.4	51.4	1.0	40.1	59.4
Actuated g/C Ratio	0.19	0.27	0.39	0.01	0.10		0.11	0.51	0.51	0.01	0.40	0.59
Clearance Time (s)	4.2	6.1	4.2	3.6	4.6		4.2	6.0	6.0	3.6	6.2	4.2
Vehicle Extension (s)	3.0	3.5	2.0	2.0	2.0		2.0	3.5	3.5	2.0	3.5	3.0
Lane Grp Cap (vph)	617	509	615	16	198		394	956	812	17	746	939
v/s Ratio Prot	c0.15	0.03	c0.07	0.01	0.02		c0.08	0.16		0.01	c0.21	0.04
v/s Ratio Perm			0.16						0.01			0.09
v/c Ratio	0.80	0.10	0.57	0.88	0.17		0.73	0.31	0.01	0.76	0.53	0.21
Uniform Delay, d1	38.6	27.2	24.1	49.5	41.3		42.8	14.1	11.9	49.4	22.9	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	0.1	0.8	158.2	0.2		5.9	0.9	0.0	99.4	2.7	0.1
Delay (s)	46.0	27.3	24.9	207.7	41.4		48.7	15.0	12.0	148.8	25.6	9.6
Level of Service	D	C	C	F	D		D	B	B	F	C	A
Approach Delay (s)		34.8			76.2			30.8			20.5	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.1	Sum of lost time (s)	20.1
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

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Appendix F

Queuing Analysis Synchro Worksheets

8451 Miralani Dr., Suite A • San Diego, CA 92126 • (858) 560-4911 • Fax (858) 560-9734

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	243	559	34	1123	93	189	112	358
v/c Ratio	0.85	0.24	0.40	0.58	0.66	0.54	0.72	0.61
Control Delay	111.1	8.7	83.8	32.5	90.2	58.6	92.8	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.1	8.7	83.8	32.5	90.2	58.6	92.8	12.1
Queue Length 50th (ft)	251	54	33	374	90	177	108	39
Queue Length 95th (ft)	#350	107	72	610	152	218	176	119
Internal Link Dist (ft)		1424		473		226		458
Turn Bay Length (ft)	475		225				50	
Base Capacity (vph)	326	2342	87	1926	165	569	179	744
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.24	0.39	0.58	0.56	0.33	0.63	0.48

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	349	36	173	10	99	538	408	4	23	303	554
v/c Ratio	0.73	0.09	0.24	0.10	0.37	0.93	0.40	0.00	0.21	0.45	0.48
Control Delay	51.9	28.0	2.9	51.3	31.9	65.4	18.2	0.0	53.0	28.5	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	28.0	2.9	51.3	31.9	65.4	18.2	0.0	53.0	28.5	2.8
Queue Length 50th (ft)	104	16	0	6	41	167	118	0	14	135	0
Queue Length 95th (ft)	#211	43	33	26	86	#358	344	0	46	288	57
Internal Link Dist (ft)		336			722		1549			1192	
Turn Bay Length (ft)	220			150		270		270	135		
Base Capacity (vph)	510	768	716	99	658	581	1009	918	114	680	1158
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.05	0.24	0.10	0.15	0.93	0.40	0.00	0.20	0.45	0.48

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	199	1187	34	692	49	60	37	124
v/c Ratio	0.78	0.45	0.35	0.30	0.45	0.20	0.37	0.36
Control Delay	83.8	19.8	78.1	21.6	81.5	24.6	79.4	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.8	19.8	78.1	21.6	81.5	24.6	79.4	13.1
Queue Length 50th (ft)	201	115	33	140	47	24	36	14
Queue Length 95th (ft)	292	419	71	331	93	56	75	63
Internal Link Dist (ft)		1424		473		226		458
Turn Bay Length (ft)	475		225				50	
Base Capacity (vph)	366	2637	115	2281	139	585	125	607
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.45	0.30	0.30	0.35	0.10	0.30	0.20

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	493	53	518	14	53	287	301	22	13	398	337
v/c Ratio	0.77	0.12	0.69	0.13	0.20	0.70	0.30	0.02	0.11	0.55	0.29
Control Delay	47.1	25.6	14.6	51.5	27.2	53.2	17.7	0.1	50.8	30.1	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	25.6	14.6	51.5	27.2	53.2	17.7	0.1	50.8	30.1	2.0
Queue Length 50th (ft)	144	22	85	8	19	87	94	0	8	189	0
Queue Length 95th (ft)	#287	54	203	33	51	#188	262	0	31	390	44
Internal Link Dist (ft)		336			722		1549			1192	
Turn Bay Length (ft)	220			150		270		270	135		
Base Capacity (vph)	709	910	757	105	691	431	995	907	120	718	1175
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.06	0.68	0.13	0.08	0.67	0.30	0.02	0.11	0.55	0.29

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	243	562	34	1135	93	189	112	358
v/c Ratio	0.83	0.24	0.37	0.60	0.62	0.54	0.66	0.60
Control Delay	104.8	12.2	80.1	34.2	83.9	58.6	84.3	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	104.8	12.2	80.1	34.2	83.9	58.6	84.3	11.3
Queue Length 50th (ft)	250	57	33	380	90	177	108	33
Queue Length 95th (ft)	345	151	72	#685	149	218	170	112
Internal Link Dist (ft)		1424		473		226		458
Turn Bay Length (ft)	475		225				50	
Base Capacity (vph)	333	2299	95	1884	240	569	254	751
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.24	0.36	0.60	0.39	0.33	0.44	0.48

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	350	36	174	10	99	538	408	4	23	303	554
v/c Ratio	0.74	0.09	0.24	0.10	0.37	0.93	0.40	0.00	0.21	0.45	0.48
Control Delay	51.9	28.0	2.9	51.3	31.9	65.4	18.2	0.0	53.0	28.5	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	28.0	2.9	51.3	31.9	65.4	18.2	0.0	53.0	28.5	2.8
Queue Length 50th (ft)	104	16	0	6	41	167	118	0	14	135	0
Queue Length 95th (ft)	#212	43	33	26	86	#358	344	0	46	288	57
Internal Link Dist (ft)		336			722		1549			1192	
Turn Bay Length (ft)	220			150		270		270	135		
Base Capacity (vph)	510	768	717	99	658	581	1008	917	114	680	1157
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.05	0.24	0.10	0.15	0.93	0.40	0.00	0.20	0.45	0.48

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	199	1200	34	698	49	60	37	124
v/c Ratio	0.78	0.46	0.35	0.31	0.44	0.20	0.37	0.36
Control Delay	83.3	20.5	78.1	21.9	80.5	24.5	78.7	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.3	20.5	78.1	21.9	80.5	24.5	78.7	13.1
Queue Length 50th (ft)	200	130	33	142	47	24	36	14
Queue Length 95th (ft)	293	427	71	337	92	56	75	63
Internal Link Dist (ft)		1424		473		226		458
Turn Bay Length (ft)	475		225				50	
Base Capacity (vph)	366	2632	115	2276	152	585	139	607
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.46	0.30	0.31	0.32	0.10	0.27	0.20

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	495	53	520	14	53	288	301	22	13	398	338
v/c Ratio	0.77	0.12	0.69	0.13	0.20	0.70	0.30	0.02	0.12	0.56	0.29
Control Delay	47.1	25.6	14.8	51.5	27.3	53.2	17.7	0.1	50.8	30.1	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	25.6	14.8	51.5	27.3	53.2	17.7	0.1	50.8	30.1	2.0
Queue Length 50th (ft)	144	22	86	8	19	88	94	0	8	189	0
Queue Length 95th (ft)	#289	54	205	33	51	#189	262	0	31	390	44
Internal Link Dist (ft)		336			722		1549			1192	
Turn Bay Length (ft)	220			150		270		270	135		
Base Capacity (vph)	708	908	757	105	689	430	995	907	120	716	1174
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.06	0.69	0.13	0.08	0.67	0.30	0.02	0.11	0.56	0.29

Intersection Summary

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