

MEMORANDUM

To:	Mr. Roger Sanchez-Rangel Caltrans, District 11	Date:	June 4, 2019
From:	John P. Keating, P.E. LLG, Engineers	LLG Ref:	3-19-3097
Subject:	2260 San Pasqual Valley Road Project – Intersection Control Evaluation (ICE)		

Engineers & Planners

Traffic
Transportation
Parking

Linscott, Law &
Greenspan, Engineers

4542 Ruffner Street
Suite 100
San Diego, CA 92111
858.300.8800 T
858.300.8810 F
www.llgengineers.com

Pasadena
Irvine
San Diego
Woodland Hills

Linscott, Law and Greenspan, Engineers (LLG) has prepared the following memorandum to detail our assessment, findings, and conclusions of the Intersection Control Evaluation (ICE) at the intersection of San Pasqual Valley Road (SR-78) and Flora Vista Street/ 2260 San Pasqual Valley Road Project driveway, a Caltrans-controlled intersection located in the County of San Diego.

LLG conducted an ICE analysis to objectively evaluate and screen intersection control alternatives at the subject intersection. The intersection traffic control options which were assessed are minor-street stop, all-way stop, signalization, and roundabout control. The intersection control alternatives were analyzed using Existing plus project traffic volumes, accounting for the proposed development of 2260 San Pasqual Road Project (“Project”) driveway main entrance to SR-78 traffic volumes. A site plan of the proposed 14 single family home development is attached as **Figure 1. The analysis concludes that a minor-street stop is the preferred alternative for this intersection.**

EXISTING TRAFFIC CONDITIONS & VOLUMES

Existing Traffic Conditions & Geometry

SR-78 is classified as an Other Principal Arterial in the California Highway System and has an ultimate classification of 4.1A Major Road in the County of San Diego General Plan Mobility Element, North County Metro Subregion. It is currently built as a two-lane undivided roadway in the vicinity of the existing intersection with Flora Vista Street. On-street parking is not permitted. There are no striped bike lanes, however the shoulder generally provides reasonable accommodation for cyclists, making it a Class III bike route. The posted speed limit is 45 mph. For the purpose of this study, SR-78 will be referred to as an east-west roadway.

Flora Vista Street is an unclassified two-lane road. The roadway terminates in a cul-de-sac.

The intersection of SR-78/Flora Vista Street is stop-controlled on the Flora Vista Street approach. The existing intersection geometry is as follows:

- Westbound: 1 shared through/left-turn lane
- Eastbound: 1 shared through/right-turn lane
- Northbound: 1 shared left/right-turn lane.

Existing conditions are depicted graphically on **Figure 2**. All figures are included at the end of this memo.

Existing Traffic Volumes

Existing AM/PM peak hour traffic counts were collected on May 9, 2019. The existing volumes are shown in **Figure 3**. The count sheets are included as **Attachment A**. No pedestrian activity was observed during the peak hour counts.

Existing Traffic Collision History

The accident history was researched from the Statewide Integrated Traffic Records System (SWITRS) for the most recent five years (2013-2018) on SR-78 at Flora Vista Street intersection. No collisions have been reported at the SR-78 / Flora Vista Street intersection within the latest five years of available data.

TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

As described earlier, the Project proposes to construct 14 single-family dwelling units. Trip generation rates for the Project were obtained from the *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region* published by the San Diego Association of Governments (SANDAG) in April 2002.

Table A summarizes the trip generation for the Project. As shown in *Table A*, the Project is calculated to generate 140 ADT with a total of 11 trips during the AM peak hour (3 inbound/ 8 outbound trips) and 14 trips during PM peak hour (10 inbound/ 4 outbound trips).

TABLE A
PROJECT TRIP GENERATION

Land Use	Size	Daily Trip Ends (ADTs)		AM Peak Hour				PM Peak Hour			
		Rate ^a	Volume	% of ADT	In:Out		Volume	% of ADT	In:Out		Volume
					Split	In	Out		Split	In	Out
Estate, Urban or Rural	14 DU	12 / DU	140	8%	30:70	4	9	10%	70:30	12	5

Footnotes:

- a. Rate from SANDAG's (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002.

The Project's distribution was assumed based on the location of the proposed access point and traffic patterns observed from the existing traffic counts. For the purposes of this assessment, it was assumed that 80% of the Project's inbound/outbound traffic is oriented to/from the west. The remaining 20% is oriented to/from the east. **Figure 4** shows the Existing with Project traffic volumes.

EXISTING PLUS PROJECT TRAFFIC CONDITIONS & GEOMETRY

The impetus for this analysis is the proposed reconfiguration of access to the 2260 San Pasqual Road Project. Access will be provided on San Pasqual Valley Road (SR-78).

The following intersection geometry is proposed for the SR-78 / Flora Vista Street and Project Driveway intersection:

- Southbound: 1 shared through / left / right-turn lane
- Westbound: 1 shared through / left / right-turn lane
- Northbound: 1 shared through / left / right-turn lane
- Eastbound: 1 shared through / left / right-turn lane

It is assumed that no left-turn pockets will be provided.

ALTERNATIVES TRAFFIC ANALYSIS

This section presents the traffic analysis of each alternative under Existing plus project traffic conditions. The traffic analysis presented includes intersection delay and level of service (LOS). The following traffic control alternatives are evaluated, with detailed discussion of each alternative in the next section:

1. Minor Street Stop Control (MSSC) [*existing traffic control on Flora Vista St.*]
2. All-Way Stop Control (AWSC)
3. Traffic Signal
4. Roundabout

Table B shows the intersection operations for each of the four (4) intersection controls with Existing plus project AM/PM peak hour volumes. **Attachment B** contains the traffic analysis worksheets for all alternatives. As shown in **Table B**, the signal alternative and roundabout alternative are calculated to operate at acceptable LOS B or better under Existing plus project conditions. The minor-street stop and all-way stop alternatives are calculated to operate at LOS C under Existing plus project conditions.

TABLE B
INTERSECTION ANALYSIS

Intersection	Control Type	Peak Hour	Existing + Project	
			Delay ^a	LOS ^b
San Pasqual Valley Rd (SR-78) / Flora Vista Street / Project Driveway	Minor Street Stop (average delay)	AM	0.3	A
		PM	0.2	A
	Minor-Street Stop (worst minor street movement)	AM	17.5	C
		PM	14.6	B
	All-Way Stop	AM	18.0	C
		PM	16.9	C
	Traffic Signal	AM	6.4	A
		PM	6.2	A
	Roundabout	AM	7.2	A
		PM	6.6	A

Footnotes:

- a. Average delay expressed in seconds per vehicle.
b. Level of Service.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

Table C presents the queue lengths for each of the four intersection control alternatives under Existing plus project AM and PM peak hour volumes. The longer queue of the AM/PM peak hours is shown for each alternative. For the signal alternative, both the 50th percentile and 95th percentile queue length are calculated. For the unsignalized alternatives, only the 95th percentile queue length can be calculated, and for the MSSC alternative, queues can only be calculated for the stop-controlled approach.

Attachment C contains the queue analysis worksheets for all alternatives.

TABLE C
QUEUE ANALYSIS

Intersection	Control Type	Peak Hour	Existing + Project	
			50 th Percentile ^a	95 th Percentile ^b
San Pasqual Valley Rd (SR-78) / Flora Vista Street / Project Driveway	Minor Street Stop ^c (Major Street Thru)	AM	—	—
		PM	—	—
	Minor-Street Stop ^c (worst minor street movement)	AM	—	3
		PM	—	0
	All-Way Stop ^c	AM	—	160
		PM	—	160
	Traffic Signal	AM	49	96
		PM	50	95
	Roundabout ^d	AM	—	75
		PM	—	50

Footnotes:

- 50th percentile queue length in feet. Higher of AM and PM peak hours.
- 95th percentile queue length in feet. Higher of AM and PM peak hours.
- 50th percentile queue and queues for uncontrolled movements cannot be calculated for the stop-control alternative.
- 50th percentile queue cannot be calculated for the roundabout alternative.

INTERSECTION ALTERNATIVES DISCUSSION

This section summarizes the traffic analysis results and other considerations for each intersection alternative.

Minor-Street Stop Control Alternative (existing control):

The minor-street stop control alternative retains the existing intersection traffic control on Flora Vista Street and assumes a stop control on proposed project access driveway approach. Analysis was completed using HCM 6 methodology and Synchro (version 10) software.

The critical minor-street left-turn delay, the southbound left, is reported in *Table B*. As shown, the addition of Project traffic with existing minor-street stop traffic control at this intersection would result in acceptable LOS C with 17.5 seconds of delay for the southbound left movement and queues of less than one vehicle for the southbound left-turn approach. The overall average delay for the intersection is less than one second, as traffic on the major street (SR-78) is not stopped.

The most significant pedestrian conflict for MSSC intersections is pedestrians crossing the major street who have potentially severe conflicts with through vehicles on the major street. Pedestrians crossing the minor street will encounter drivers turning into the driveway and drivers being processed through the stop sign. These drivers are focused primarily on looking for gaps in the major street traffic and may

not see pedestrians. However, no pedestrian activity is found at this intersection during peak hour counts. Development of this project is not anticipated to generate any substantial increase in pedestrian crossing demand at this location.

All-Way Stop Control Alternative:

This alternative assumes the same lane geometry as Existing/MSSC with the addition of stop control on the major road. Analysis was completed using HCM 6 methodology and Synchro (version 10) software.

Under this traffic control the intersection would also operate at LOS C. However, the delay shown in *Table B* represents the average delay for all movements, rather than just the minor street approaches and should be compared to the corresponding average delay results for the minor street stop control.

As shown in *Table B*, the 95th percentile queue is 160 feet for westbound vehicles, much longer than that calculated with minor-street control. Making all vehicles stop is not desirable where there is such a large disparity between the major and minor street volumes.

Because all vehicles are required to stop, AWSC intersections normally have a low incidence of severe pedestrian crashes. However, traffic may be turning onto the exiting approach from multiple directions, increasing the complexity of crossing these intersection types. Drivers that perceive no imminent vehicle conflicts may roll through stop signs and occasionally fail to notice pedestrians. However, no pedestrian activity is found at this intersection during peak hour counts.

Traffic Signal Alternative:

The proposed traffic signal includes the following modifications to intersection striping: eastbound and westbound approach shared left/through/right lane to one left turn only and one through/right lane. North-south permissive phasing is proposed. Signalized analysis completed using HCM 6 methodology and Synchro (version 10) software.

With a traffic signal, the intersection is calculated to operate at LOS A during the AM and PM peak hour. The longest calculated 95th percentile queue is 96 feet for westbound through movement.

Traffic signals can reduce the likelihood of pedestrian-vehicle conflicts by providing visual and audible pedestrian signal indications in coordination with compatible vehicular traffic phases. However, pedestrian conflicts can still occur due to: red light running (illegal), right turns on green, left turns on green, and right turns on red (legal). The greatest left-turn volume is 10 vehicles on southbound approach for this project. Based on the low minor-street volume and pedestrian activity, this location is not expected to be warranted for a traffic signal.

Roundabout:

The proposed roundabout design includes a single approach lane in all directions and a single circulating lane. Roundabout analysis was completed using HCM 6 methodology and Synchro (version 10) software.

With roundabout control the intersection would operate at LOS C overall, as well as LOS C or better at each individual approach. The calculated 95th percentile queue would be less than with a traffic signal. It should be noted that there are relatively very few inbound/outbound trips in the AM/PM peak hour due to the nature of residential land uses.

In general, the performance of roundabouts during off-peak periods is good compared with other intersections forms, requiring fewer vehicles to stop or slow, though no off-peak analysis was completed at this intersection.

A single-lane roundabout designed for low speed operation, as is proposed for this intersection, is “one of the safest treatments available for at-grade intersections. Drivers have no lane decisions to make. Pedestrians cross one lane of traffic at a time. Roadways speeds and widths are low enough to allow comfortable mixed bicycle and motor vehicle flow.” (NCHRP, 2010, pgs. 2-4)

Roundabouts often require more space than comparable stop-controlled or signalized intersections. However, because traffic at this location can be accommodated with a single-lane roundabout, preliminary design indicates a roundabout would not require additional right of way at this intersection. A concept plan is shown as **Figure 5**.

SUMMARY

As shown in *Table B*, each intersection alternative is calculated to operate adequately at LOS C or better during AM and PM peak hours for Existing plus project conditions. With the development of the proposed Project, the existing intersection control (MSSC) would provide adequate traffic operations. The overall intersection with MSSC operates with minimal delay (less than 1.0 seconds/vehicle in all scenarios). Queuing on the controlled approaches is calculated to be minimal.

Within the past five years of data, no traffic collisions were identified. As such, there is no evidence of safety issues which would suggest consideration of alternative traffic control.

The conclusion of this evaluation is that while each alternative provides acceptable traffic operations, the minor-street stop control appears to be most suitable traffic control, given the low volume from minor streets and lack of pedestrian activity observed.

Figures

1. Site Plan
2. Existing Conditions
3. Existing Traffic Volumes
4. Existing plus project Traffic Volumes

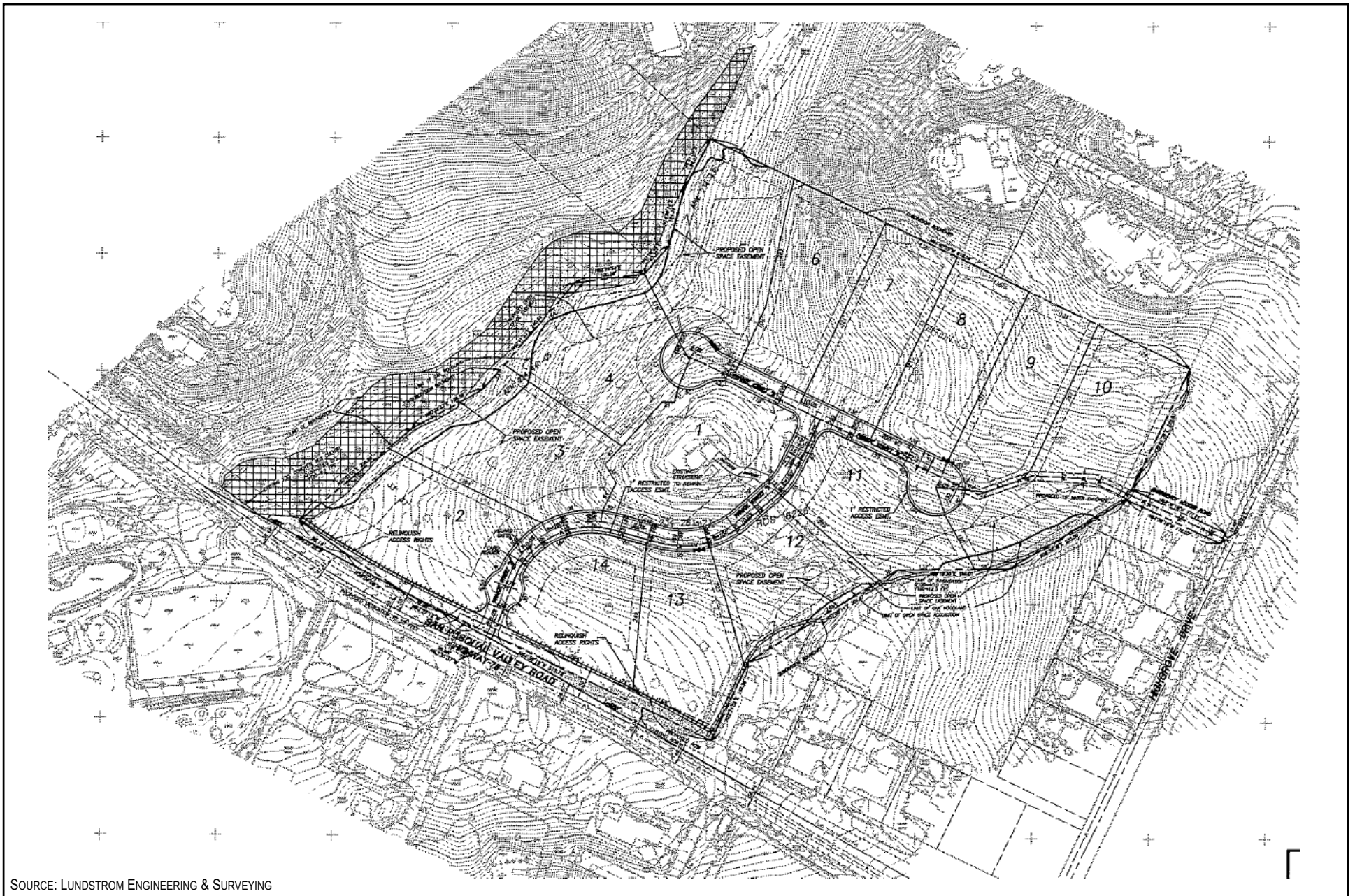
Attachments

- A. Peak Hour Intersection Count Sheets
- B. Peak Hour Intersection Analysis Worksheets
- C. Queue Analysis Worksheets

Mr. Roger Sanchez-Rangel
June 4, 2019
Page 8



5. Roundabout Concept Plan





N:\3097\Figures

Figure 2

Existing Conditions

INTERSECTION CONTROL EVALUATION



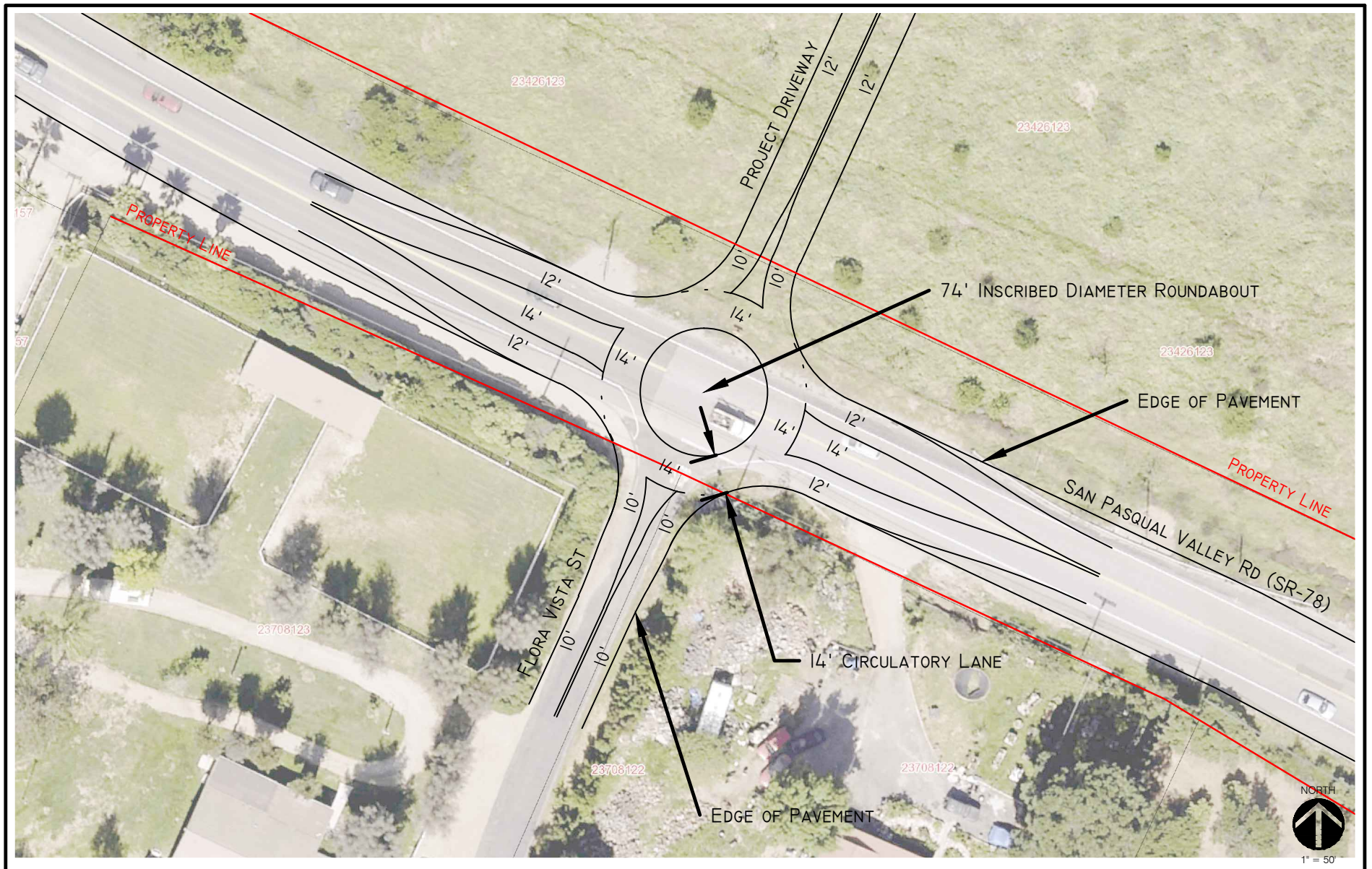
N:\3097\Figures

Figure 3

Existing Traffic Volumes

INTERSECTION CONTROL EVALUATION





Source:
N:\3097\Concept Plan\3097.RoundAbout

LINSCOTT
LAW &
GREENSPAN
engineers

Figure 5
Roundabout

Mr. Roger Sanchez-Rangel
June 4, 2019



Attachment A
Intersection Count Sheets

National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 78 & Flora Vista St
City: Escondido
Control: 1-Way Stop (EB)

Project ID: 19-04229-001
Date: 5/9/2019

Total

NS/EW Streets:	SR 78					SR 78				Flora Vista St				Flora Vista St				
AM	NORTHBOUND					SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	1 NT	0 NR	0 NU		0 SL	1 ST	0 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
7:00 AM	0	85	0	0		0	105	1	0	0	0	2	0	0	0	0	0	193
7:15 AM	0	117	0	0		0	119	1	0	0	0	0	0	0	0	0	0	237
7:30 AM	0	126	0	0		0	111	0	0	0	0	0	0	0	0	0	0	237
7:45 AM	0	116	0	1		0	116	0	0	0	0	0	0	0	0	0	0	233
8:00 AM	0	110	0	0		0	127	0	0	1	0	0	0	0	0	0	0	238
8:15 AM	0	146	0	0		0	161	0	0	0	0	2	0	0	0	0	0	309
8:30 AM	0	152	0	0		0	104	2	0	1	0	1	0	0	0	0	0	260
8:45 AM	0	90	0	0		0	106	0	0	0	0	0	0	0	0	0	0	196
TOTAL VOLUMES :	NL	NT	NR	NU		SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	942	0	1		0	949	4	0	2	0	5	0	0	0	0	0	1903
	0.00%	99.89%	0.00%	0.11%		0.00%	99.58%	0.42%	0.00%	28.57%	0.00%	71.43%	0.00%					
PEAK HR :	07:45 AM - 08:45 AM																	TOTAL
PEAK HR VOL :	0	524	0	1		0	508	2	0	2	0	3	0	0	0	0	0	1040
PEAK HR FACTOR :	0.000	0.862	0.000	0.250		0.000	0.789	0.250	0.000	0.500	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.841
	0.863					0.792				0.625								
PM	NORTHBOUND					SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	1 NT	0 NR	0 NU		0 SL	1 ST	0 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
4:00 PM	0	135	0	0		0	133	1	0	0	0	0	0	0	0	0	0	269
4:15 PM	0	132	0	0		0	117	0	0	0	0	0	0	0	0	0	0	249
4:30 PM	0	146	0	0		0	100	0	0	0	0	0	0	0	0	0	0	246
4:45 PM	0	118	0	0		0	113	0	0	0	0	0	0	0	0	0	0	231
5:00 PM	0	136	0	0		0	109	0	0	0	0	0	0	0	0	0	0	245
5:15 PM	0	133	0	0		0	120	5	0	0	0	0	0	0	0	0	0	258
5:30 PM	0	108	0	0		0	107	0	0	1	0	0	0	0	0	0	0	216
5:45 PM	0	111	0	0		0	98	0	0	0	0	0	0	0	0	0	0	209
TOTAL VOLUMES :	NL	NT	NR	NU		SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	1019	0	0		0	897	6	0	1	0	0	0	0	0	0	0	1923
	0.00%	100.00%	0.00%	0.00%		0.00%	99.34%	0.66%	0.00%	100.00%	0.00%	0.00%	0.00%					
PEAK HR :	04:00 PM - 05:00 PM																	TOTAL
PEAK HR VOL :	0	531	0	0		0	463	1	0	0	0	0	0	0	0	0	0	995
PEAK HR FACTOR :	0.000	0.909	0.000	0.000		0.000	0.870	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.925
	0.909					0.866												

Location: SR 78 & Flora Vista St
City: Escondido
Control: 1-Way Stop (EB)

Project ID: 19-04229-001
Date: 5/9/2019

Bikes

[illegible][illegible]

National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 78 & Flora Vista St

Project ID: 19-04229-001

City: Escondido

Date: 5/9/2019

Pedestrians (Crosswalks)

NS/EW Streets:	SR 78		SR 78		Flora Vista St		Flora Vista St	
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB
APPROACH %'s :	0	0	0	0	0	0	0	0
PEAK HR :	07:45 AM - 08:45 AM							
PEAK HR VOL :	0	0	0	0	0	0	0	0
PEAK HR FACTOR :								
								TOTAL
								0

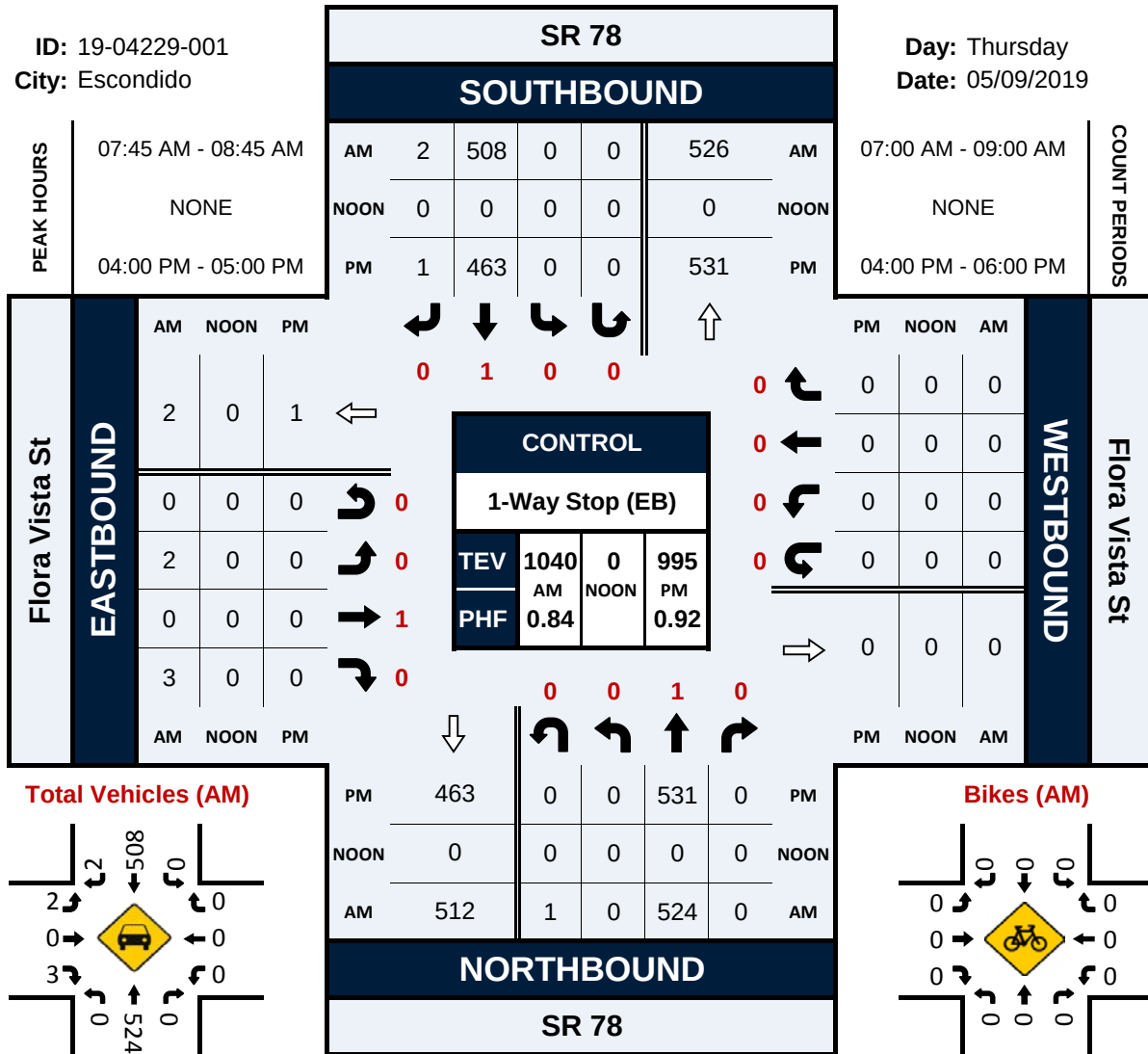
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB
APPROACH %'s :	0	0	0	0	0	0	0	0
PEAK HR :	04:00 PM - 05:00 PM							
PEAK HR VOL :	0	0	0	0	0	0	0	0
PEAK HR FACTOR :								
								TOTAL
								0

SR 78 & Flora Vista St

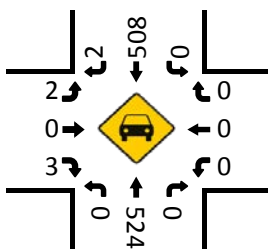
Peak Hour Turning Movement Count

ID: 19-04229-001
City: Escondido

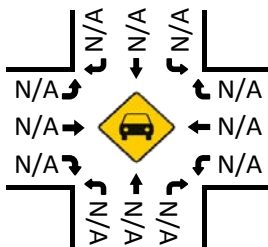
Day: Thursday
Date: 05/09/2019



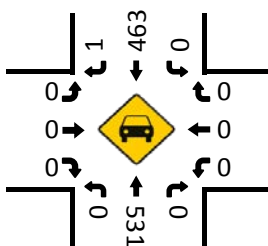
Total Vehicles (AM)



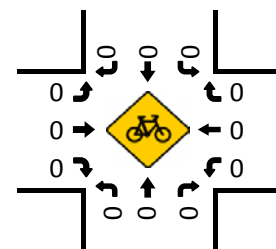
Total Vehicles (Noon)



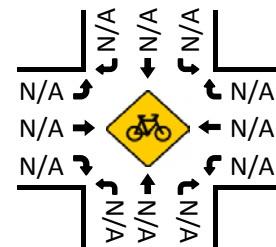
Total Vehicles (PM)



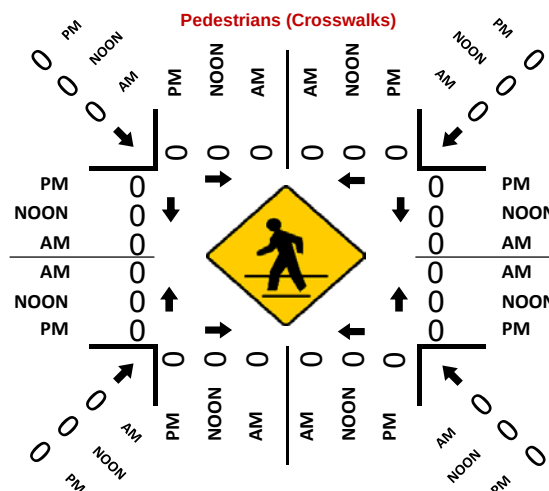
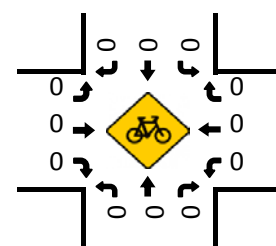
Bikes (AM)



Bikes (Noon)



Bikes (PM)



VOLUME

SR 78 W/O Flora Vista St

Day: Thursday

Date: 5/9/2019

City: Escondido

Project #: CA19_4228_001

DAILY TOTALS					NB	SB	EB					WB	Total
					5,963	6,306						0	0
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
00:00	3	4			7	12:00	97	70			167		
00:15	2	7			9	12:15	71	81			152		
00:30	5	5			10	12:30	84	94			178		
00:45	2	12	8	24	10	12:45	76	328	100	345	176	673	
01:00	2	7			9	13:00	99	90			189		
01:15	2	4			6	13:15	109	130			239		
01:30	5	0			5	13:30	128	131			259		
01:45	3	12	3	14	6	13:45	133	469	71	422	204	891	
02:00	1	0			1	14:00	97	81			178		
02:15	4	2			6	14:15	107	90			197		
02:30	2	0			2	14:30	141	93			234		
02:45	4	11	0	2	4	14:45	121	466	117	381	238	847	
03:00	1	3			4	15:00	169	120			289		
03:15	3	0			3	15:15	170	97			267		
03:30	3	1			4	15:30	168	103			271		
03:45	6	13	6	10	12	15:45	132	639	116	436	248	1075	
04:00	10	9			19	16:00	139	137			276		
04:15	10	3			13	16:15	129	119			248		
04:30	9	22			31	16:30	143	101			244		
04:45	15	44	20	54	35	16:45	118	529	112	469	230	998	
05:00	15	21			36	17:00	129	111			240		
05:15	23	31			54	17:15	127	125			252		
05:30	54	42			96	17:30	104	114			218		
05:45	48	140	92	186	140	17:45	104	464	93	443	197	907	
06:00	49	52			101	18:00	62	94			156		
06:15	64	88			152	18:15	62	89			151		
06:30	84	93			177	18:30	71	102			173		
06:45	82	279	108	341	190	18:45	62	257	68	353	130	610	
07:00	89	112			201	19:00	49	64			113		
07:15	111	127			238	19:15	37	64			101		
07:30	126	111			237	19:30	29	38			67		
07:45	116	442	112	462	228	19:45	33	148	42	208	75	356	
08:00	109	133			242	20:00	24	31			55		
08:15	150	166			316	20:15	34	68			102		
08:30	147	106			253	20:30	22	51			73		
08:45	95	501	111	516	206	20:45	21	101	53	203	74	304	
09:00	62	128			190	21:00	28	49			77		
09:15	77	106			183	21:15	17	41			58		
09:30	95	104			199	21:30	23	40			63		
09:45	81	315	95	433	176	21:45	20	88	26	156	46	244	
10:00	77	93			170	22:00	17	18			35		
10:15	72	104			176	22:15	16	22			38		
10:30	95	83			178	22:30	8	18			26		
10:45	88	332	95	375	183	22:45	11	52	15	73	26	125	
11:00	70	79			149	23:00	6	9			15		
11:15	73	87			160	23:15	12	15			27		
11:30	61	100			161	23:30	13	11			24		
11:45	77	281	91	357	168	23:45	9	40	8	43	17	83	
TOTALS	2382	2774			5156	TOTALS	3581	3532			7113		
SPLIT %	46.2%	53.8%			42.0%	SPLIT %	50.3%	49.7%			58.0%		

DAILY TOTALS					NB	SB						EB	WB	Total	
					5,963	6,306						0	0	12,269	
AM Peak Hour	07:45	07:30				07:45	PM Peak Hour	15:00	15:30					15:00	
AM Pk Volume	522	522				1039	PM Pk Volume	639	475					1075	
Pk Hr Factor	0.870	0.786				0.822	Pk Hr Factor	0.940	0.867					0.930	
7 - 9 Volume	943	978	0	0		1921	4 - 6 Volume	993	912	0	0			1905	
7 - 9 Peak Hour	07:45	07:30				07:45	4 - 6 Peak Hour	16:00	16:00					16:00	
7 - 9 Pk Volume	522	522	0	0		1039	4 - 6 Pk Volume	529	469	0	0			998	
Pk Hr Factor	0.870	0.786	0.000	0.000		0.822	Pk Hr Factor	0.925	0.856	0.000	0.000			0.904	

Mr. Roger Sanchez-Rangel
June 4, 2019



Attachment B
Peak Hour Intersection Analysis Worksheets

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	508	2	1	524	1	2	0	3	2	0	7
Future Vol, veh/h	3	508	2	1	524	1	2	0	3	2	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	552	2	1	570	1	2	0	3	2	0	8
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	571	0	0	554	0	0	1136	1132	553	1134	1133	571
Stage 1	-	-	-	-	-	-	559	559	-	573	573	-
Stage 2	-	-	-	-	-	-	577	573	-	561	560	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1002	-	-	1016	-	-	179	203	533	180	203	520
Stage 1	-	-	-	-	-	-	513	511	-	505	504	-
Stage 2	-	-	-	-	-	-	502	504	-	512	511	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1002	-	-	1016	-	-	176	202	533	178	202	520
Mov Cap-2 Maneuver	-	-	-	-	-	-	176	202	-	178	202	-
Stage 1	-	-	-	-	-	-	511	509	-	503	503	-
Stage 2	-	-	-	-	-	-	494	503	-	507	509	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0.1		0			17.5			15.2			
HCM LOS						C			C			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	294	1002	-	-	1016	-	-	364				
HCM Lane V/C Ratio	0.018	0.003	-	-	0.001	-	-	0.027				
HCM Control Delay (s)	17.5	8.6	0	-	8.5	0	-	15.2				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1				

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	463	1	0	531	2	0	0	0	1	0	4
Future Vol, veh/h	10	463	1	0	531	2	0	0	0	1	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	503	1	0	577	2	0	0	0	1	0	4
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	579	0	0	504	0	0	1106	1105	504	1104	1104	578
Stage 1	-	-	-	-	-	-	526	526	-	578	578	-
Stage 2	-	-	-	-	-	-	580	579	-	526	526	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	995	-	-	1061	-	-	188	211	568	188	211	516
Stage 1	-	-	-	-	-	-	535	529	-	501	501	-
Stage 2	-	-	-	-	-	-	500	501	-	535	529	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	995	-	-	1061	-	-	184	208	568	186	208	516
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	208	-	186	208	-
Stage 1	-	-	-	-	-	-	527	521	-	493	501	-
Stage 2	-	-	-	-	-	-	496	501	-	527	521	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0			0			14.6		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-	995	-	-	1061	-	-	381				
HCM Lane V/C Ratio	-	0.011	-	-	-	-	-	0.014				
HCM Control Delay (s)	0	8.7	0	-	0	-	-	14.6				
HCM Lane LOS	A	A	A	-	A	-	-	B				
HCM 95th %tile O(veh)	-	0	-	-	0	-	-	0				

Intersection	
Intersection Delay, s/veh	18
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	508	2	1	524	1	2	0	3	2	0	7
Future Vol, veh/h	3	508	2	1	524	1	2	0	3	2	0	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	552	2	1	570	1	2	0	3	2	0	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	17.8	18.5	9.2	9.1
HCM LOS	C	C	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	1%	0%	22%
Vol Thru, %	0%	99%	100%	0%
Vol Right, %	60%	0%	0%	78%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	513	526	9
LT Vol	2	3	1	2
Through Vol	0	508	524	0
RT Vol	3	2	1	7
Lane Flow Rate	5	558	572	10
Geometry Grp	1	1	1	1
Degree of Util (X)	0.009	0.706	0.722	0.016
Departure Headway (Hd)	6.042	4.561	4.548	5.885
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	588	792	795	603
Service Time	4.126	2.591	2.578	3.967
HCM Lane V/C Ratio	0.009	0.705	0.719	0.017
HCM Control Delay	9.2	17.8	18.5	9.1
HCM Lane LOS	A	C	C	A
HCM 95th-tile Q	0	6	6.3	0

Intersection	
Intersection Delay, s/veh	16.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	463	1	0	531	2	0	0	0	1	0	4
Future Vol, veh/h	10	463	1	0	531	2	0	0	0	1	0	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	503	1	0	577	2	0	0	0	1	0	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.6	18.1	0	8.9
HCM LOS	C	C	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	2%	0%	20%
Vol Thru, %	100%	98%	100%	0%
Vol Right, %	0%	0%	0%	80%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	474	533	5
LT Vol	0	10	0	1
Through Vol	0	463	531	0
RT Vol	0	1	2	4
Lane Flow Rate	0	515	579	5
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.649	0.72	0.009
Departure Headway (Hd)	6.24	4.535	4.471	5.77
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	799	811	617
Service Time	4.312	2.557	2.492	3.84
HCM Lane V/C Ratio	0	0.645	0.714	0.008
HCM Control Delay	9.3	15.6	18.1	8.9
HCM Lane LOS	N	C	C	A
HCM 95th-tile Q	0	4.9	6.3	0

SR-78 / Flora Vista Street ICE
1: Flora Vista St/Project Driveway & SR-78

Signal AM
06/04/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	508	2	1	524	1	2	0	3	2	0	7
Future Volume (veh/h)	3	508	2	1	524	1	2	0	3	2	0	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	552	2	1	570	1	2	0	3	2	0	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	462	848	3	473	850	1	263	57	185	196	34	248
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.19	0.00	0.19	0.19	0.00	0.19
Sat Flow, veh/h	841	1862	7	854	1866	3	342	292	952	142	177	1276
Grp Volume(v), veh/h	3	0	554	1	0	571	5	0	0	10	0	0
Grp Sat Flow(s),veh/h/ln	841	0	1869	854	0	1870	1586	0	0	1595	0	0
Q Serve(g_s), s	0.1	0.0	5.9	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	6.2	0.0	5.9	5.9	0.0	6.2	0.1	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		0.00	1.00		0.00	0.40		0.60	0.20		0.80
Lane Grp Cap(c), veh/h	462	0	852	473	0	852	504	0	0	478	0	0
V/C Ratio(X)	0.01	0.00	0.65	0.00	0.00	0.67	0.01	0.00	0.00	0.02	0.00	0.00
Avail Cap(c_a), veh/h	913	0	1853	931	0	1854	1267	0	0	1260	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.9	0.0	5.4	7.7	0.0	5.5	8.4	0.0	0.0	8.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.8	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.9	0.0	6.3	7.7	0.0	6.4	8.4	0.0	0.0	8.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		557			572			5			10	
Approach Delay, s/veh		6.3			6.4			8.4			8.4	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.5		16.2		9.5		16.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		25.5		18.0		25.5				
Max Q Clear Time (g_c+I1), s		2.1		8.2		2.1		8.2				
Green Ext Time (p_c), s		0.0		3.4		0.0		3.6				
Intersection Summary												
HCM 6th Ctrl Delay			6.4									
HCM 6th LOS			A									

SR-78 / Flora Vista Street ICE
1: Flora Vista St/Project Driveway & SR-78

Signal PM
06/04/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	463	1	0	531	2	0	0	0	1	0	4
Future Volume (veh/h)	10	463	1	0	531	2	0	0	0	1	0	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	503	1	0	577	2	0	0	0	1	0	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	459	857	2	278	856	3	0	361	0	193	36	247
Arrive On Green	0.46	0.46	0.46	0.00	0.46	0.46	0.00	0.00	0.00	0.19	0.00	0.19
Sat Flow, veh/h	835	1866	4	895	1863	6	0	1870	0	136	184	1278
Grp Volume(v), veh/h	11	0	504	0	0	579	0	0	0	5	0	0
Grp Sat Flow(s),veh/h/ln	835	0	1870	895	0	1869	0	1870	0	1597	0	0
Q Serve(g_s), s	0.3	0.0	5.2	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	6.6	0.0	5.2	0.0	0.0	6.3	0.0	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		0.00	1.00		0.00	0.00		0.00	0.20		0.80
Lane Grp Cap(c), veh/h	459	0	859	278	0	858	0	361	0	475	0	0
V/C Ratio(X)	0.02	0.00	0.59	0.00	0.00	0.67	0.00	0.00	0.00	0.01	0.00	0.00
Avail Cap(c_a), veh/h	898	0	1841	748	0	1841	0	1300	0	1253	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.1	0.0	5.2	0.0	0.0	5.5	0.0	0.0	0.0	8.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.6	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.8	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.1	0.0	5.8	0.0	0.0	6.4	0.0	0.0	0.0	8.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		515			579			0			5	
Approach Delay, s/veh		5.9			6.4			0.0			8.5	
Approach LOS		A			A						A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.5		16.4		9.5		16.4				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		25.5		18.0		25.5				
Max Q Clear Time (g_c+I1), s		0.0		8.6		2.1		8.3				
Green Ext Time (p_c), s		0.0		3.1		0.0		3.6				
Intersection Summary												
HCM 6th Ctrl Delay			6.2									
HCM 6th LOS			A									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection				
Intersection Delay, s/veh	7.2			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	610	626	6	10
Demand Flow Rate, veh/h	622	638	6	10
Vehicles Circulating, veh/h	3	5	622	639
Vehicles Exiting, veh/h	646	623	3	4
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.1	7.3	5.0	5.1
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	L	LTR
Assumed Moves	LTR	LTR	L	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	622	638	6	10
Cap Entry Lane, veh/h	1376	1373	732	719
Entry HV Adj Factor	0.981	0.980	1.000	1.000
Flow Entry, veh/h	610	626	6	10
Cap Entry, veh/h	1349	1346	732	719
V/C Ratio	0.452	0.465	0.008	0.014
Control Delay, s/veh	7.1	7.3	5.0	5.1
LOS	A	A	A	A
95th %tile Queue, veh	2	3	0	0

Intersection				
Intersection Delay, s/veh	6.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	515	579	0	5
Demand Flow Rate, veh/h	525	591	0	5
Vehicles Circulating, veh/h	1	11	525	589
Vehicles Exiting, veh/h	593	514	1	13
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.2	6.9	0.0	4.8
Approach LOS	A	A	-	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	525	591	0	5
Cap Entry Lane, veh/h	1378	1364	808	757
Entry HV Adj Factor	0.981	0.980	1.000	1.000
Flow Entry, veh/h	515	579	0	5
Cap Entry, veh/h	1352	1338	808	757
V/C Ratio	0.381	0.433	0.000	0.007
Control Delay, s/veh	6.2	6.9	4.5	4.8
LOS	A	A	A	A
95th %tile Queue, veh	2	2	0	0

Mr. Roger Sanchez-Rangel
June 4, 2019



Attachment C
Queue Analysis Worksheets

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	508	2	1	524	1	2	0	3	2	0	7
Future Vol, veh/h	3	508	2	1	524	1	2	0	3	2	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	552	2	1	570	1	2	0	3	2	0	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	571	0	0	554	0	0	1136	1132	553	1134	1133	571
Stage 1	-	-	-	-	-	-	559	559	-	573	573	-
Stage 2	-	-	-	-	-	-	577	573	-	561	560	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1002	-	-	1016	-	-	179	203	533	180	203	520
Stage 1	-	-	-	-	-	-	513	511	-	505	504	-
Stage 2	-	-	-	-	-	-	502	504	-	512	511	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1002	-	-	1016	-	-	176	202	533	178	202	520
Mov Cap-2 Maneuver	-	-	-	-	-	-	176	202	-	178	202	-
Stage 1	-	-	-	-	-	-	511	509	-	503	503	-
Stage 2	-	-	-	-	-	-	494	503	-	507	509	-
Approach	EB		WB				NB		SB			
HCM Control Delay, s	0.1		0				17.5		15.2			
HCM LOS							C		C			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	294	1002	-	-	1016	-	-	364				
HCM Lane V/C Ratio	0.018	0.003	-	-	0.001	-	-	0.027				
HCM Control Delay (s)	17.5	8.6	0	-	8.5	0	-	15.2				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1				

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	463	1	0	531	2	0	0	0	1	0	4
Future Vol, veh/h	10	463	1	0	531	2	0	0	0	1	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	503	1	0	577	2	0	0	0	1	0	4
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	579	0	0	504	0	0	1106	1105	504	1104	1104	578
Stage 1	-	-	-	-	-	-	526	526	-	578	578	-
Stage 2	-	-	-	-	-	-	580	579	-	526	526	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	995	-	-	1061	-	-	188	211	568	188	211	516
Stage 1	-	-	-	-	-	-	535	529	-	501	501	-
Stage 2	-	-	-	-	-	-	500	501	-	535	529	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	995	-	-	1061	-	-	184	208	568	186	208	516
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	208	-	186	208	-
Stage 1	-	-	-	-	-	-	527	521	-	493	501	-
Stage 2	-	-	-	-	-	-	496	501	-	527	521	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0			0			14.6		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-	995	-	-	1061	-	-	381				
HCM Lane V/C Ratio	-	0.011	-	-	-	-	-	0.014				
HCM Control Delay (s)	0	8.7	0	-	0	-	-	14.6				
HCM Lane LOS	A	A	A	-	A	-	-	B				
HCM 95th %tile O(veh)	-	0	-	-	0	-	-	0				

Intersection	
Intersection Delay, s/veh	18
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	508	2	1	524	1	2	0	3	2	0	7
Future Vol, veh/h	3	508	2	1	524	1	2	0	3	2	0	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	552	2	1	570	1	2	0	3	2	0	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	17.8	18.5	9.2	9.1
HCM LOS	C	C	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	1%	0%	22%
Vol Thru, %	0%	99%	100%	0%
Vol Right, %	60%	0%	0%	78%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	513	526	9
LT Vol	2	3	1	2
Through Vol	0	508	524	0
RT Vol	3	2	1	7
Lane Flow Rate	5	558	572	10
Geometry Grp	1	1	1	1
Degree of Util (X)	0.009	0.706	0.722	0.016
Departure Headway (Hd)	6.042	4.561	4.548	5.885
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	588	792	795	603
Service Time	4.126	2.591	2.578	3.967
HCM Lane V/C Ratio	0.009	0.705	0.719	0.017
HCM Control Delay	9.2	17.8	18.5	9.1
HCM Lane LOS	A	C	C	A
HCM 95th-tile Q	0	6	6.3	0

Intersection	
Intersection Delay, s/veh	16.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	463	1	0	531	2	0	0	0	1	0	4
Future Vol, veh/h	10	463	1	0	531	2	0	0	0	1	0	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	503	1	0	577	2	0	0	0	1	0	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.6	18.1	0	8.9
HCM LOS	C	C	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	2%	0%	20%
Vol Thru, %	100%	98%	100%	0%
Vol Right, %	0%	0%	0%	80%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	474	533	5
LT Vol	0	10	0	1
Through Vol	0	463	531	0
RT Vol	0	1	2	4
Lane Flow Rate	0	515	579	5
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.649	0.72	0.009
Departure Headway (Hd)	6.24	4.535	4.471	5.77
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	799	811	617
Service Time	4.312	2.557	2.492	3.84
HCM Lane V/C Ratio	0	0.645	0.714	0.008
HCM Control Delay	9.3	15.6	18.1	8.9
HCM Lane LOS	N	C	C	A
HCM 95th-tile Q	0	4.9	6.3	0



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	3	554	1	571	5	10
v/c Ratio	0.01	0.61	0.00	0.63	0.02	0.03
Control Delay	3.3	8.3	3.0	8.6	0.4	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	8.3	3.0	8.6	0.4	2.9
Queue Length 50th (ft)	0	47	0	49	0	0
Queue Length 95th (ft)	2	92	1	96	1	4
Internal Link Dist (ft)		492		510	288	235
Turn Bay Length (ft)	100		100			
Base Capacity (vph)	614	1632	640	1634	968	997
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.34	0.00	0.35	0.01	0.01
Intersection Summary						



Lane Group	EBL	EBT	WBT	SBT
Lane Group Flow (vph)	11	504	579	5
v/c Ratio	0.03	0.54	0.63	0.02
Control Delay	3.4	7.3	8.5	0.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.4	7.3	8.5	0.4
Queue Length 50th (ft)	1	41	50	0
Queue Length 95th (ft)	4	77	95	1
Internal Link Dist (ft)		492	510	235
Turn Bay Length (ft)	100			
Base Capacity (vph)	603	1616	1614	988
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.02	0.31	0.36	0.01
Intersection Summary				

Intersection				
Intersection Delay, s/veh	7.2			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	610	626	6	10
Demand Flow Rate, veh/h	622	638	6	10
Vehicles Circulating, veh/h	3	5	622	639
Vehicles Exiting, veh/h	646	623	3	4
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.1	7.3	5.0	5.1
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	L	LTR
Assumed Moves	LTR	LTR	L	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	622	638	6	10
Cap Entry Lane, veh/h	1376	1373	732	719
Entry HV Adj Factor	0.981	0.980	1.000	1.000
Flow Entry, veh/h	610	626	6	10
Cap Entry, veh/h	1349	1346	732	719
V/C Ratio	0.452	0.465	0.008	0.014
Control Delay, s/veh	7.1	7.3	5.0	5.1
LOS	A	A	A	A
95th %tile Queue, veh	2	3	0	0

Intersection				
Intersection Delay, s/veh	6.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	515	579	0	5
Demand Flow Rate, veh/h	525	591	0	5
Vehicles Circulating, veh/h	1	11	525	589
Vehicles Exiting, veh/h	593	514	1	13
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.2	6.9	0.0	4.8
Approach LOS	A	A	-	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	525	591	0	5
Cap Entry Lane, veh/h	1378	1364	808	757
Entry HV Adj Factor	0.981	0.980	1.000	1.000
Flow Entry, veh/h	515	579	0	5
Cap Entry, veh/h	1352	1338	808	757
V/C Ratio	0.381	0.433	0.000	0.007
Control Delay, s/veh	6.2	6.9	4.5	4.8
LOS	A	A	A	A
95th %tile Queue, veh	2	2	0	0