

Regional Intersection Control Evaluation

Transportation Agency of Monterey County

Appendix A: LOS Concept



LEVEL-OF-SERVICE CONCEPT

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from “A” to “F”.

SIGNALIZED INTERSECTIONS

The six level-of-service grades are described qualitatively for signalized intersections in Table B1. Additionally, Table B2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service “D” is generally considered to represent the minimum acceptable design standard.

Table B-1: Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

1 Most of the material in this appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2000).

Table B-2: Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2000 Highway Capacity Manual (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table B3. A quantitative definition of level of service for unsignalized intersections is presented in Table B4. Using this definition, Level of Service “E” is generally considered to

represent the minimum acceptable design standard.

Table B3: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	<ul style="list-style-type: none"> Nearly all drivers find freedom of operation. Very seldom is there more than one vehicle in queue.
B	<ul style="list-style-type: none"> Some drivers begin to consider the delay an inconvenience. Occasionally there is more than one vehicle in queue.
C	<ul style="list-style-type: none"> Many times there is more than one vehicle in queue. Most drivers feel restricted, but not objectionably so.
D	<ul style="list-style-type: none"> Often there is more than one vehicle in queue. Drivers feel quite restricted.
E	<ul style="list-style-type: none"> Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. There is almost always more than one vehicle in queue. Drivers find the delays approaching intolerable levels.
F	<ul style="list-style-type: none"> Forced flow. Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table B-4: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

The level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths should be considered because of their impacts on the operational and safety performance of the intersection. By focusing on a single MOE

for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

ROUNABOUT INTERSECTIONS

The levels of service (LOS) criteria for automobiles in roundabouts are given in Table B-5. As the table notes, LOS F is assigned if the volume-to-capacity ratio of a lane exceeds 1.0 regardless of the control delay. For assessment of LOS at the approach and intersection levels, LOS is based solely on control delay. The thresholds in Table B-5 are based on the considered judgment of the Transportation Research Board Committee on Highway Capacity and Quality of Service.

Table B-5: Level-of-Service Criteria for Roundabout Intersections

Control Delay (s/veh)	Level of Service by Volume-to-Capacity Ratio*	
	v/c ≤ 1.0	v/c > 1.0
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

*For approaches and intersection-wide assessment, LOS is defined solely by control delay

Roundabouts share the same basic control delay formulation with two-way and all-way STOP-controlled intersections, adjusting for the effect of YIELD control. However, at the time of publication of 2010 edition of the Highway Capacity Manual (HCM), no research was available on traveler perception of quality of service at roundabouts. In the absence of such research, the service measure and thresholds have been made consistent with those for other unsignalized intersections, primarily on the basis of this similar control delay formulation.

Regional Intersection Control Evaluation
Section 1:

City of Greenfield

Appendix B1: Analysis Worksheets

Study Intersections:

- WALNUT AVENUE AT EL CAMINO REAL



WALNUT AVENUE AT EL CAMINO REAL

Capital Cost Worksheet

City of Greenfield **Capital Cost Worksheet**

GRF_01 Walnut Avenue at El Camino Real

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 1,616,580	\$ 2,123,025	\$ 506,445	\$ (15,584)	\$ 1,446,513	\$ 490,861	2.95
High	\$ 1,778,238	\$ 1,910,723	\$ 132,485			\$ 116,901	12.37
Low	\$ 1,454,922	\$ 2,335,328	\$ 880,406			\$ 864,822	1.67
Breakeven	\$ 1,616,580	\$ 3,078,677	\$ 1,462,097			\$ 1,446,513	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAABOUT
\$ -	\$ 600,000
\$ -	\$ 1,000,000
\$ -	\$ 1,400,000
\$ -	\$ 1,800,000
\$ 737,903	\$ 2,200,000
\$ 1,137,903	\$ 2,600,000
\$ 1,537,903	\$ 3,000,000
\$ 1,937,903	\$ 3,400,000
\$ 2,337,903	\$ 3,800,000
\$ 2,737,903	\$ 4,200,000

Cost Sensitivity Assumptions

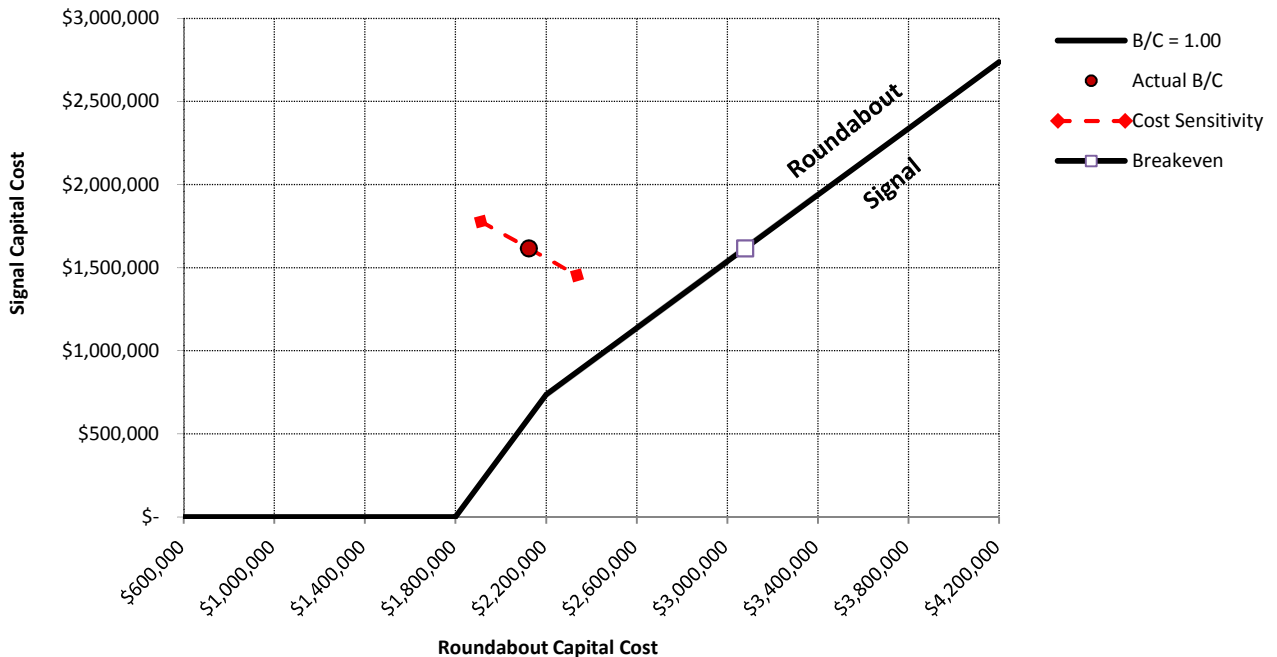
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	45%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 400,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



WALNUT AVENUE AT EL CAMINO REAL

Turning Movement Volumes

EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	45	67	131	149	149	74	59	102	24	10	237	22
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians	100		225	200		25	25		100	0		200
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	58	158	215	284	307	163	146	176	50	33	287	67
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians	100		225	200		25	25		100	0		200
Bicycles												
Source: Walnut Avenue Commercial Area Specific Plan and EIR				Dated: 2013								

2035												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2035												
Vehicles	129	165	165	173	250	148	242	206	77	52	295	103
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians	100		225	200		25	25		100	0		200
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2035												
Vehicles	124	263	292	404	505	240	229	263	103	98	396	103
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians	100		225	200		25	25		100	0		200
Bicycles												
Source: Walnut Avenue Commercial Area Specific Plan and EIR				Dated: 2013								









2030 - Compound Growth												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
- Compound G												
Vehicles	103	136	157	167	223	127	178	177	60	36	281	74
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians	100	0	225	200	0	25	25	0	100	0	0	200
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
- Compound G												
Vehicles	105	235	273	374	453	221	208	241	88	77	369	94
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Pedestrians	100	0	225	200	0	25	25	0	100	0	0	200
Bicycles												
Source: Walnut Avenue Commercial Area Specific Plan and EIR				Dated: 2013								

WALNUT AVENUE AT EL CAMINO REAL

Synchro Outputs

Queues
1: Walnut Ave & El Camino Real





















								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	282	162	242	49	215	64	137
v/c Ratio	0.06	0.52	0.81	0.28	0.24	0.58	0.32	0.29
Control Delay	30.3	19.1	63.2	10.6	31.8	17.1	34.3	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	19.1	63.2	10.6	31.8	17.1	34.3	17.8
Queue Length 50th (ft)	3	67	46	33	13	24	17	22
Queue Length 95th (ft)	22	164	#238	128	#66	104	#91	95
Internal Link Dist (ft)		596		740		529		488
Turn Bay Length (ft)	115		250		140		200	
Base Capacity (vph)	200	1313	200	1279	200	724	200	953
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	0.06	0.21	0.81	0.19	0.24	0.30	0.32	0.14

Intersection Summary

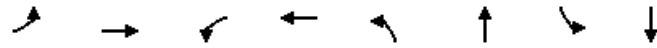
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

TAMC Regional ICE - Greenfield
 Existing AM (2014)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	237	22	149	149	74	45	67	131	59	102	24
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.74	1.00		0.77	1.00		0.62	1.00		0.84
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	258	24	162	162	80	49	73	142	64	111	26
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	24	635	59	111	468	231	74	118	230	84	425	100
Arrive On Green	0.01	0.39	0.39	0.06	0.44	0.44	0.04	0.30	0.30	0.05	0.30	0.30
Sat Flow, veh/h	1774	1624	151	1774	1063	525	1774	398	774	1774	1401	328
Grp Volume(v), veh/h	11	0	282	162	0	242	49	0	215	64	0	137
Grp Sat Flow(s),veh/h/ln	1774	0	1775	1774	0	1589	1774	0	1172	1774	0	1729
Q Serve(g_s), s	0.5	0.0	9.2	5.0	0.0	8.0	2.2	0.0	12.6	2.8	0.0	4.8
Cycle Q Clear(g_c), s	0.5	0.0	9.2	5.0	0.0	8.0	2.2	0.0	12.6	2.8	0.0	4.8
Prop In Lane	1.00		0.09	1.00		0.33	1.00		0.66	1.00		0.19
Lane Grp Cap(c), veh/h	24	0	694	111	0	700	74	0	349	84	0	525
V/C Ratio(X)	0.46	0.00	0.41	1.45	0.00	0.35	0.66	0.00	0.62	0.76	0.00	0.26
Avail Cap(c_a), veh/h	111	0	736	111	0	700	111	0	353	111	0	525
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.0	0.0	17.5	37.3	0.0	14.7	37.6	0.0	24.1	37.5	0.0	21.0
Incr Delay (d2), s/veh	12.9	0.0	0.4	247.3	0.0	0.3	9.8	0.0	3.1	19.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.3	0.0	4.5	10.1	0.0	3.6	1.3	0.0	4.4	1.8	0.0	2.3
LnGrp Delay(d),s/veh	51.9	0.0	17.9	284.6	0.0	15.0	47.4	0.0	27.2	56.5	0.0	21.2
LnGrp LOS	D		B	F		B	D		C	E		C
Approach Vol, veh/h		293			404			264			201	
Approach Delay, s/veh		19.2			123.1			31.0			32.5	
Approach LOS		B			F			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	27.7	9.0	35.2	7.3	28.2	5.1	39.1				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	5.0	24.0	5.0	33.0	5.0	24.0	5.0	33.0				
Max Q Clear Time (g_c+I1), s	4.8	14.6	7.0	11.2	4.2	6.8	2.5	10.0				
Green Ext Time (p_c), s	0.0	1.7	0.0	1.9	0.0	2.5	0.0	3.6				
Intersection Summary												
HCM 2010 Ctrl Delay			60.3									
HCM 2010 LOS			E									

Queues
1: Walnut Ave & El Camino Real



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	36	385	309	511	63	406	159	245
v/c Ratio	0.29	0.69	2.47	0.75	0.50	0.87	1.27	0.40
Control Delay	42.2	27.2	707.5	27.2	52.0	41.8	206.5	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	27.2	707.5	27.2	52.0	41.8	206.5	22.2
Queue Length 50th (ft)	17	144	~250	203	29	143	~100	83
Queue Length 95th (ft)	48	231	#434	320	#89	#346	#234	167
Internal Link Dist (ft)		596		740		529		488
Turn Bay Length (ft)	115		250		140		200	
Base Capacity (vph)	125	813	125	832	125	500	125	611
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	0.29	0.47	2.47	0.61	0.50	0.81	1.27	0.40

Intersection Summary











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

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

TAMC Regional ICE - Greenfield
 Existing PM (2014)



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	33	287	67	284	307	163	58	158	215	146	176	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.74	1.00		0.76	1.00		0.62	1.00		0.84
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	36	312	73	309	334	177	63	172	234	159	191	54
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	527	123	109	424	225	83	152	207	109	411	116
Arrive On Green	0.03	0.39	0.39	0.06	0.41	0.41	0.05	0.29	0.29	0.06	0.31	0.31
Sat Flow, veh/h	1774	1359	318	1774	1023	542	1774	518	705	1774	1333	377
Grp Volume(v), veh/h	36	0	385	309	0	511	63	0	406	159	0	245
Grp Sat Flow(s),veh/h/ln	1774	0	1677	1774	0	1565	1774	0	1224	1774	0	1710
Q Serve(g_s), s	1.6	0.0	14.9	5.0	0.0	23.2	2.9	0.0	24.0	5.0	0.0	9.4
Cycle Q Clear(g_c), s	1.6	0.0	14.9	5.0	0.0	23.2	2.9	0.0	24.0	5.0	0.0	9.4
Prop In Lane	1.00		0.19	1.00		0.35	1.00		0.58	1.00		0.22
Lane Grp Cap(c), veh/h	61	0	650	109	0	649	83	0	360	109	0	528
V/C Ratio(X)	0.59	0.00	0.59	2.85	0.00	0.79	0.76	0.00	1.13	1.46	0.00	0.46
Avail Cap(c_a), veh/h	109	0	677	109	0	649	109	0	360	109	0	528
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	19.9	38.3	0.0	20.8	38.5	0.0	28.8	38.3	0.0	22.8
Incr Delay (d2), s/veh	8.9	0.0	1.3	855.2	0.0	6.4	20.1	0.0	87.3	252.2	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.0	0.0	7.1	28.2	0.0	11.1	1.9	0.0	16.7	10.0	0.0	4.5
LnGrp Delay(d),s/veh	47.8	0.0	21.2	893.6	0.0	27.2	58.6	0.0	116.2	290.5	0.0	23.4
LnGrp LOS	D		C	F		C	E		F	F		C
Approach Vol, veh/h		421			820			469				404
Approach Delay, s/veh		23.4			353.7			108.4				128.5
Approach LOS		C			F			F				F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	28.0	9.0	35.7	7.8	29.2	6.8	37.9				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	5.0	24.0	5.0	33.0	5.0	24.0	5.0	33.0				
Max Q Clear Time (g_c+I1), s	7.0	26.0	7.0	16.9	4.9	11.4	3.6	25.2				
Green Ext Time (p_c), s	0.0	0.0	0.0	4.9	0.0	4.2	0.0	3.8				
Intersection Summary												
HCM 2010 Ctrl Delay			190.5									
HCM 2010 LOS			F									

Queues
1: Walnut Ave & El Camino Real












										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	282	162	162	80	49	73	142	64	137
v/c Ratio	0.05	0.34	0.24	0.21	0.12	0.17	0.17	0.37	0.15	0.30
Control Delay	22.4	16.8	19.5	11.8	3.0	21.6	16.8	7.1	22.0	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	16.8	19.5	11.8	3.0	21.6	16.8	7.1	22.0	16.7
Queue Length 50th (ft)	3	32	19	22	0	11	17	0	8	21
Queue Length 95th (ft)	16	69	47	85	18	41	45	35	25	75
Internal Link Dist (ft)		596		740			529			488
Turn Bay Length (ft)	150		200		150	150		150	200	
Base Capacity (vph)	243	2713	755	1545	1261	318	1301	861	440	1158
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.10	0.21	0.10	0.06	0.15	0.06	0.16	0.15	0.12
Intersection Summary										

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

TAMC Regional ICE - Greenfield
 Proposed AM (2014)

























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 						 		
Volume (veh/h)	10	237	22	149	149	74	45	67	131	59	102	24
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.85	1.00		0.78	1.00		0.77	1.00		0.83
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	11	258	24	162	162	80	49	73	142	64	111	26
Adj No. of Lanes	1	2	0	2	1	1	1	1	1	2	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	24	1273	116	241	841	557	73	543	354	162	416	97
Arrive On Green	0.01	0.40	0.40	0.07	0.45	0.45	0.04	0.29	0.29	0.05	0.30	0.30
Sat Flow, veh/h	1774	3223	295	3442	1863	1233	1774	1863	1216	3442	1399	328
Grp Volume(v), veh/h	11	140	142	162	162	80	49	73	142	64	0	137
Grp Sat Flow(s),veh/h/ln	1774	1770	1749	1721	1863	1233	1774	1863	1216	1721	0	1727
Q Serve(g_s), s	0.5	4.2	4.4	3.7	4.3	3.1	2.2	2.4	7.6	1.5	0.0	4.9
Cycle Q Clear(g_c), s	0.5	4.2	4.4	3.7	4.3	3.1	2.2	2.4	7.6	1.5	0.0	4.9
Prop In Lane	1.00		0.17	1.00		1.00	1.00		1.00	1.00		0.19
Lane Grp Cap(c), veh/h	24	699	691	241	841	557	73	543	354	162	0	513
V/C Ratio(X)	0.46	0.20	0.21	0.67	0.19	0.14	0.67	0.13	0.40	0.40	0.00	0.27
Avail Cap(c_a), veh/h	109	718	709	338	841	557	153	641	419	212	0	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	16.2	16.2	36.9	13.4	13.1	38.5	21.3	23.1	37.6	0.0	21.8
Incr Delay (d2), s/veh	13.0	0.1	0.1	3.2	0.1	0.1	10.2	0.1	0.7	1.6	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.3	2.1	2.1	1.9	2.2	1.1	1.3	1.2	2.6	0.7	0.0	2.4
LnGrp Delay(d),s/veh	52.9	16.3	16.4	40.2	13.5	13.2	48.6	21.4	23.9	39.2	0.0	22.1
LnGrp LOS	D	B	B	D	B	B	D	C	C	D		C
Approach Vol, veh/h		293			404			264			201	
Approach Delay, s/veh		17.7			24.1			27.8			27.5	
Approach LOS		B			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	27.7	9.7	36.1	7.3	28.2	5.1	40.7				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	5.0	28.0	8.0	33.0	7.0	26.0	5.0	36.0				
Max Q Clear Time (g_c+I1), s	3.5	9.6	5.7	6.4	4.2	6.9	2.5	6.3				
Green Ext Time (p_c), s	0.0	1.8	0.1	2.6	0.0	1.8	0.0	3.3				
Intersection Summary												
HCM 2010 Ctrl Delay			23.9									
HCM 2010 LOS			C									

Queues
1: Walnut Ave & El Camino Real













											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	36	312	73	309	334	177	63	172	234	159	245
v/c Ratio	0.23	0.66	0.17	0.53	0.44	0.25	0.34	0.45	0.66	0.40	0.48
Control Delay	39.1	31.6	0.9	31.8	19.3	4.0	38.2	29.3	14.0	35.2	26.5
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	39.1	31.6	0.9	31.8	19.3	4.0	38.2	29.3	14.0	35.2	26.5
Queue Length 50th (ft)	14	117	0	61	111	0	25	63	0	31	88
Queue Length 95th (ft)	51	235	2	126	214	39	75	138	72	76	189
Internal Link Dist (ft)		596			740			529			488
Turn Bay Length (ft)	150		150	200		150	150		150	250	
Base Capacity (vph)	163	944	719	790	1201	1025	228	772	478	442	718
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	0.22	0.33	0.10	0.39	0.28	0.17	0.28	0.22	0.49	0.36	0.34
Intersection Summary											

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

TAMC Regional ICE - Greenfield
 Proposed PM (2014)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	33	287	67	284	307	163	58	158	215	146	176	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.84	1.00		0.78	1.00		0.59	1.00		0.83
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	36	312	73	309	334	177	63	172	234	159	191	54
Adj No. of Lanes	1	1	1	2	1	1	1	1	1	2	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	678	481	396	831	548	81	515	260	232	397	112
Arrive On Green	0.03	0.36	0.36	0.12	0.45	0.45	0.05	0.28	0.28	0.07	0.30	0.30
Sat Flow, veh/h	1774	1863	1322	3442	1863	1228	1774	1863	939	3442	1331	376
Grp Volume(v), veh/h	36	312	73	309	334	177	63	172	234	159	0	245
Grp Sat Flow(s),veh/h/ln	1774	1863	1322	1721	1863	1228	1774	1863	939	1721	0	1707
Q Serve(g_s), s	1.8	11.6	3.4	7.9	10.9	8.4	3.2	6.7	21.7	4.1	0.0	10.6
Cycle Q Clear(g_c), s	1.8	11.6	3.4	7.9	10.9	8.4	3.2	6.7	21.7	4.1	0.0	10.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	58	678	481	396	831	548	81	515	260	232	0	509
V/C Ratio(X)	0.62	0.46	0.15	0.78	0.40	0.32	0.78	0.33	0.90	0.69	0.00	0.48
Avail Cap(c_a), veh/h	118	680	483	571	865	571	177	556	280	343	0	510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.2	22.0	19.4	38.9	16.9	16.2	42.7	26.1	31.5	41.2	0.0	26.0
Incr Delay (d2), s/veh	10.1	0.5	0.1	4.4	0.3	0.3	14.5	0.4	28.4	3.6	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.1	6.0	1.2	4.0	5.6	2.9	1.9	3.5	7.7	2.1	0.0	5.1
LnGrp Delay(d),s/veh	53.3	22.5	19.5	43.3	17.2	16.5	57.2	26.4	59.9	44.8	0.0	26.7
LnGrp LOS	D	C	B	D	B	B	E	C	E	D		C
Approach Vol, veh/h		421			820			469			404	
Approach Delay, s/veh		24.6			26.9			47.3			33.8	
Approach LOS		C			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.1	29.0	14.4	36.9	8.1	31.0	7.0	44.3				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	9.0	27.0	15.0	33.0	9.0	27.0	6.0	42.0				
Max Q Clear Time (g_c+I1), s	6.1	23.7	9.9	13.6	5.2	12.6	3.8	12.9				
Green Ext Time (p_c), s	0.1	1.3	0.5	5.3	0.0	3.7	0.0	6.0				
Intersection Summary												
HCM 2010 Ctrl Delay			32.3									
HCM 2010 LOS			C									

Queues
1: Walnut Ave & El Camino Real

























												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	39	305	80	182	242	138	112	148	171	193	257	
v/c Ratio	0.22	0.64	0.19	0.46	0.34	0.21	0.46	0.34	0.50	0.47	0.54	
Control Delay	33.6	28.1	3.7	32.8	18.2	5.0	34.9	22.7	9.7	32.0	25.2	
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	33.6	28.1	3.7	32.8	18.2	5.0	34.9	22.7	9.7	32.0	25.2	
Queue Length 50th (ft)	14	101	0	33	56	0	39	45	0	35	80	
Queue Length 95th (ft)	48	197	18	76	152	36	#104	101	47	79	167	
Internal Link Dist (ft)		596			740			529			488	
Turn Bay Length (ft)	115		150	250		150	150		150	200		
Base Capacity (vph)	178	1031	774	403	1063	914	267	812	487	430	724	
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	0.22	0.30	0.10	0.45	0.23	0.15	0.42	0.18	0.35	0.45	0.35	

Intersection Summary













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

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

TAMC Regional ICE - Greenfield
 Proposed AM (2040)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	281	74	167	223	127	103	136	157	178	177	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.84	1.00		0.76	1.00		0.60	1.00		0.82
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	39	305	80	182	242	138	112	148	171	193	192	65
Adj No. of Lanes	1	1	1	2	1	1	1	1	1	2	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	63	699	499	257	772	498	142	527	270	270	353	120
Arrive On Green	0.04	0.38	0.38	0.07	0.41	0.41	0.08	0.28	0.28	0.08	0.28	0.28
Sat Flow, veh/h	1774	1863	1330	3442	1863	1201	1774	1863	953	3442	1255	425
Grp Volume(v), veh/h	39	305	80	182	242	138	112	148	171	193	0	257
Grp Sat Flow(s),veh/h/ln	1774	1863	1330	1721	1863	1201	1774	1863	953	1721	0	1680
Q Serve(g_s), s	1.8	10.4	3.4	4.4	7.4	6.4	5.3	5.2	13.3	4.6	0.0	11.0
Cycle Q Clear(g_c), s	1.8	10.4	3.4	4.4	7.4	6.4	5.3	5.2	13.3	4.6	0.0	11.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.25
Lane Grp Cap(c), veh/h	63	699	499	257	772	498	142	527	270	270	0	473
V/C Ratio(X)	0.62	0.44	0.16	0.71	0.31	0.28	0.79	0.28	0.63	0.71	0.00	0.54
Avail Cap(c_a), veh/h	126	726	518	284	772	498	188	572	293	325	0	496
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.3	19.8	17.6	38.3	16.7	16.4	38.3	23.7	26.6	38.1	0.0	25.8
Incr Delay (d2), s/veh	9.6	0.4	0.1	7.0	0.2	0.3	15.0	0.3	3.9	5.8	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.1	5.4	1.3	2.3	3.8	2.2	3.2	2.7	3.8	2.4	0.0	5.2
LnGrp Delay(d),s/veh	49.9	20.2	17.7	45.3	16.9	16.7	53.3	24.0	30.5	43.9	0.0	26.9
LnGrp LOS	D	C	B	D	B	B	D	C	C	D		C
Approach Vol, veh/h		424			562			431			450	
Approach Delay, s/veh		22.5			26.1			34.2			34.2	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.7	28.0	10.3	35.8	10.8	27.8	7.0	39.1				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	8.0	26.0	7.0	33.0	9.0	25.0	6.0	34.0				
Max Q Clear Time (g_c+I1), s	6.6	15.3	6.4	12.4	7.3	13.0	3.8	9.4				
Green Ext Time (p_c), s	0.1	2.8	0.0	3.4	0.0	3.0	0.0	4.7				
Intersection Summary												
HCM 2010 Ctrl Delay			29.1									
HCM 2010 LOS			C									

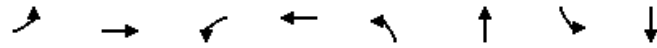
Queues
1: Walnut Ave & El Camino Real

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	84	401	102	407	492	240	114	255	297	226	358	
v/c Ratio	0.49	0.78	0.25	0.74	0.71	0.35	0.62	0.52	0.75	0.66	0.81	
Control Delay	50.8	40.1	3.4	45.7	31.4	6.9	55.8	32.1	20.8	50.1	44.6	
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	50.8	40.1	3.4	45.7	31.4	6.9	55.8	32.1	20.8	50.1	44.6	
Queue Length 50th (ft)	44	204	0	111	243	16	61	117	23	63	173	
Queue Length 95th (ft)	102	321	18	#209	379	69	#153	213	#169	#132	#335	
Internal Link Dist (ft)		596			740			529			488	
Turn Bay Length (ft)	115		150	250		150	150		150	200		
Base Capacity (vph)	194	748	519	585	862	797	201	635	440	351	565	
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	0.43	0.54	0.20	0.70	0.57	0.30	0.57	0.40	0.68	0.64	0.63	

Intersection Summary

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

Queues
1: Walnut Ave & El Camino Real
























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	57	433	188	433	140	358	263	308
v/c Ratio	0.43	0.78	1.41	0.62	1.05	0.82	1.98	0.62
Control Delay	46.1	30.7	255.8	21.5	132.9	37.3	489.5	26.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	30.7	255.8	21.5	132.9	37.3	489.5	26.7
Queue Length 50th (ft)	24	159	~117	149	~72	116	~186	102
Queue Length 95th (ft)	#79	267	#274	253	#206	#291	#375	211
Internal Link Dist (ft)		596		740		529		488
Turn Bay Length (ft)	115		250		140		200	
Base Capacity (vph)	133	842	133	880	133	537	133	628
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	0.43	0.51	1.41	0.49	1.05	0.67	1.98	0.49

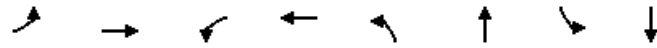
Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	295	103	173	250	148	129	165	165	242	206	77
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.75	1.00		0.76	1.00		0.61	1.00		0.83
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	57	321	112	188	272	161	140	179	179	263	224	84
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	79	471	164	108	396	235	108	186	186	108	355	133
Arrive On Green	0.04	0.39	0.39	0.06	0.41	0.41	0.06	0.29	0.29	0.06	0.29	0.29
Sat Flow, veh/h	1774	1201	419	1774	969	574	1774	639	639	1774	1216	456
Grp Volume(v), veh/h	57	0	433	188	0	433	140	0	358	263	0	308
Grp Sat Flow(s),veh/h/ln	1774	0	1620	1774	0	1543	1774	0	1278	1774	0	1671
Q Serve(g_s), s	2.6	0.0	18.2	5.0	0.0	19.0	5.0	0.0	22.7	5.0	0.0	13.2
Cycle Q Clear(g_c), s	2.6	0.0	18.2	5.0	0.0	19.0	5.0	0.0	22.7	5.0	0.0	13.2
Prop In Lane	1.00		0.26	1.00		0.37	1.00		0.50	1.00		0.27
Lane Grp Cap(c), veh/h	79	0	636	108	0	631	108	0	373	108	0	487
V/C Ratio(X)	0.73	0.00	0.68	1.74	0.00	0.69	1.30	0.00	0.96	2.44	0.00	0.63
Avail Cap(c_a), veh/h	108	0	650	108	0	631	108	0	373	108	0	487
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.8	0.0	20.7	38.6	0.0	20.0	38.6	0.0	28.7	38.6	0.0	25.3
Incr Delay (d2), s/veh	14.2	0.0	2.8	370.2	0.0	3.1	186.7	0.0	36.2	675.0	0.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.6	0.0	8.6	13.5	0.0	8.6	8.0	0.0	11.7	22.6	0.0	6.4
LnGrp Delay(d),s/veh	53.1	0.0	23.6	408.8	0.0	23.1	225.3	0.0	64.9	713.7	0.0	27.9
LnGrp LOS	D		C	F		C	F		E	F		C
Approach Vol, veh/h		490			621			498				571
Approach Delay, s/veh		27.0			139.9			110.0				343.8
Approach LOS		C			F			F				F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	28.0	9.0	36.3	9.0	28.0	7.6	37.6				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	5.0	24.0	5.0	33.0	5.0	24.0	5.0	33.0				
Max Q Clear Time (g_c+I1), s	7.0	24.7	7.0	20.2	7.0	15.2	4.6	21.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	4.5	0.0	3.3	0.0	5.0				
Intersection Summary												
HCM 2010 Ctrl Delay			161.1									
HCM 2010 LOS			F									

Queues
1: Walnut Ave & El Camino Real



























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	107	542	439	810	135	603	249	398
v/c Ratio	1.01	0.79	4.14	1.14	1.27	1.37	2.35	0.79
Control Delay	133.3	31.1	1449.0	103.3	213.8	207.3	657.1	38.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	133.3	31.1	1449.0	103.3	213.8	207.3	657.1	38.6
Queue Length 50th (ft)	~57	233	~424	~488	~90	~397	~215	179
Queue Length 95th (ft)	#158	#400	#599	#709	#200	#599	#357	#321
Internal Link Dist (ft)		596		740		529		488
Turn Bay Length (ft)	115		250		140		200	
Base Capacity (vph)	106	689	106	713	106	439	106	505
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	1.01	0.79	4.14	1.14	1.27	1.37	2.35	0.79

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

TAMC Regional ICE - Greenfield
 Proposed PM (2040)













												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	77	369	94	374	453	221	105	235	273	208	241	88
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.75	1.00		0.61	1.00		0.83
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	84	401	102	407	492	240	114	255	297	226	262	96
Adj No. of Lanes	1	1	1	2	1	1	1	1	1	2	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	108	604	355	474	747	477	142	537	278	294	359	132
Arrive On Green	0.06	0.32	0.32	0.14	0.40	0.40	0.08	0.29	0.29	0.09	0.29	0.29
Sat Flow, veh/h	1774	1863	1095	3442	1863	1189	1774	1863	965	3442	1226	449
Grp Volume(v), veh/h	84	401	102	407	492	240	114	255	297	226	0	358
Grp Sat Flow(s),veh/h/ln	1774	1863	1095	1721	1863	1189	1774	1863	965	1721	0	1675
Q Serve(g_s), s	4.5	18.0	6.7	11.2	20.9	14.7	6.1	11.0	28.0	6.2	0.0	18.7
Cycle Q Clear(g_c), s	4.5	18.0	6.7	11.2	20.9	14.7	6.1	11.0	28.0	6.2	0.0	18.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.27
Lane Grp Cap(c), veh/h	108	604	355	474	747	477	142	537	278	294	0	491
V/C Ratio(X)	0.78	0.66	0.29	0.86	0.66	0.50	0.80	0.48	1.07	0.77	0.00	0.73
Avail Cap(c_a), veh/h	164	633	372	496	747	477	183	537	278	319	0	491
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.0	28.3	24.5	41.0	23.7	21.8	43.9	28.5	34.6	43.5	0.0	30.9
Incr Delay (d2), s/veh	12.4	2.5	0.4	13.7	2.1	0.8	17.4	0.7	73.1	10.2	0.0	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	2.6	9.7	2.1	6.2	11.1	4.9	3.7	5.8	13.1	3.4	0.0	9.4
LnGrp Delay(d),s/veh	57.4	30.7	24.9	54.7	25.8	22.7	61.3	29.2	107.7	53.7	0.0	36.3
LnGrp LOS	E	C	C	D	C	C	E	C	F	D		D
Approach Vol, veh/h		587			1139			666			584	
Approach Delay, s/veh		33.5			35.5			69.7			43.0	
Approach LOS		C			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.3	32.0	17.4	35.5	11.8	32.5	9.9	43.0				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	9.0	28.0	14.0	33.0	10.0	27.0	9.0	38.0				
Max Q Clear Time (g_c+I1), s	8.2	30.0	13.2	20.0	8.1	20.7	6.5	22.9				
Green Ext Time (p_c), s	0.1	0.0	0.1	4.9	0.0	3.1	0.0	6.9				
Intersection Summary												
HCM 2010 Ctrl Delay			44.2									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

TAMC Regional ICE - Greenfield
 Future PM (2045)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	98	396	103	404	505	240	124	263	292	229	263	103
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.75	1.00		0.75	1.00		0.61	1.00		0.83
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	107	430	112	439	549	261	135	286	317	249	286	112
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	107	525	137	107	424	202	107	172	190	107	346	135
Arrive On Green	0.06	0.40	0.40	0.06	0.40	0.40	0.06	0.29	0.29	0.06	0.29	0.29
Sat Flow, veh/h	1774	1322	344	1774	1066	507	1774	594	659	1774	1196	468
Grp Volume(v), veh/h	107	0	542	439	0	810	135	0	603	249	0	398
Grp Sat Flow(s),veh/h/ln	1774	0	1666	1774	0	1573	1774	0	1253	1774	0	1665
Q Serve(g_s), s	5.0	0.0	24.1	5.0	0.0	33.0	5.0	0.0	24.0	5.0	0.0	18.5
Cycle Q Clear(g_c), s	5.0	0.0	24.1	5.0	0.0	33.0	5.0	0.0	24.0	5.0	0.0	18.5
Prop In Lane	1.00		0.21	1.00		0.32	1.00		0.53	1.00		0.28
Lane Grp Cap(c), veh/h	107	0	662	107	0	625	107	0	362	107	0	481
V/C Ratio(X)	1.00	0.00	0.82	4.11	0.00	1.30	1.26	0.00	1.66	2.33	0.00	0.83
Avail Cap(c_a), veh/h	107	0	662	107	0	625	107	0	362	107	0	481
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.0	0.0	22.3	39.0	0.0	25.0	39.0	0.0	29.5	39.0	0.0	27.6
Incr Delay (d2), s/veh	87.4	0.0	8.0	1420.4	0.0	144.5	173.6	0.0	310.9	626.6	0.0	11.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	5.0	0.0	12.5	44.6	0.0	39.3	7.6	0.0	39.5	21.0	0.0	10.0
LnGrp Delay(d),s/veh	126.4	0.0	30.3	1459.4	0.0	169.5	212.6	0.0	340.4	665.6	0.0	38.9
LnGrp LOS	F		C	F		F	F		F	F		D
Approach Vol, veh/h		649			1249			738				647
Approach Delay, s/veh		46.1			622.9			317.0				280.1
Approach LOS		D			F			F				F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	28.0	9.0	37.0	9.0	28.0	9.0	37.0				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	5.0	24.0	5.0	33.0	5.0	24.0	5.0	33.0				
Max Q Clear Time (g_c+I1), s	7.0	26.0	7.0	26.1	7.0	20.5	7.0	35.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	5.0	0.0	2.3	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			372.6									
HCM 2010 LOS			F									

Queues
1: Walnut Ave & El Camino Real

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	57	321	112	188	272	161	140	179	179	263	308	
v/c Ratio	0.32	0.68	0.30	0.51	0.44	0.26	0.56	0.39	0.51	0.57	0.71	
Control Delay	37.0	30.8	7.2	36.8	22.9	5.3	40.0	24.6	9.5	34.5	32.1	
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	37.0	30.8	7.2	36.8	22.9	5.3	40.0	24.6	9.5	34.5	32.1	
Queue Length 50th (ft)	22	118	0	38	96	0	53	61	0	52	107	
Queue Length 95th (ft)	65	219	36	#88	184	41	#146	126	51	#108	211	
Internal Link Dist (ft)		596			740			529			488	
Turn Bay Length (ft)	115		150	250		150	150		150	200		
Base Capacity (vph)	191	952	631	372	952	844	274	692	445	496	639	
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	0.30	0.34	0.18	0.51	0.29	0.19	0.51	0.26	0.40	0.53	0.48	

Intersection Summary

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













HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

TAMC Regional ICE - Greenfield
 Proposed AM (2045)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	295	103	173	250	148	129	165	165	242	206	77
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.73	1.00		0.75	1.00		0.59	1.00		0.82
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	57	321	112	188	272	161	140	179	179	263	224	84
Adj No. of Lanes	1	1	1	2	1	1	1	1	1	2	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	76	678	418	261	740	470	173	514	259	341	336	126
Arrive On Green	0.04	0.36	0.36	0.08	0.40	0.40	0.10	0.28	0.28	0.10	0.28	0.28
Sat Flow, veh/h	1774	1863	1149	3442	1863	1185	1774	1863	938	3442	1211	454
Grp Volume(v), veh/h	57	321	112	188	272	161	140	179	179	263	0	308
Grp Sat Flow(s),veh/h/ln	1774	1863	1149	1721	1863	1185	1774	1863	938	1721	0	1665
Q Serve(g_s), s	2.8	11.5	5.9	4.6	8.9	8.2	6.7	6.7	14.8	6.5	0.0	14.2
Cycle Q Clear(g_c), s	2.8	11.5	5.9	4.6	8.9	8.2	6.7	6.7	14.8	6.5	0.0	14.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.27
Lane Grp Cap(c), veh/h	76	678	418	261	740	470	173	514	259	341	0	462
V/C Ratio(X)	0.75	0.47	0.27	0.72	0.37	0.34	0.81	0.35	0.69	0.77	0.00	0.67
Avail Cap(c_a), veh/h	143	710	438	278	740	470	205	516	260	398	0	462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.0	21.1	19.4	39.1	18.4	18.2	38.3	25.1	28.1	38.0	0.0	27.7
Incr Delay (d2), s/veh	13.4	0.5	0.3	8.1	0.3	0.4	18.4	0.4	7.6	7.7	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.6	6.0	1.9	2.5	4.7	2.7	4.1	3.5	4.4	3.4	0.0	7.0
LnGrp Delay(d),s/veh	54.3	21.7	19.7	47.2	18.7	18.6	56.7	25.5	35.6	45.8	0.0	31.3
LnGrp LOS	D	C	B	D	B	B	E	C	D	D		C
Approach Vol, veh/h		490			621			498			571	
Approach Delay, s/veh		25.0			27.3			37.9			38.0	
Approach LOS		C			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.6	27.9	10.6	35.5	12.4	28.0	7.7	38.4				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	10.0	24.0	7.0	33.0	10.0	24.0	7.0	33.0				
Max Q Clear Time (g_c+I1), s	8.5	16.8	6.6	13.5	8.7	16.2	4.8	10.9				
Green Ext Time (p_c), s	0.1	2.5	0.0	3.8	0.0	2.7	0.0	5.4				
Intersection Summary												
HCM 2010 Ctrl Delay			32.0									
HCM 2010 LOS			C									

Queues

1: Walnut Ave & El Camino Real

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	107	430	112	439	549	261	135	286	317	249	398	
v/c Ratio	0.63	0.80	0.27	0.82	0.84	0.40	0.80	0.55	0.79	0.85	0.86	
Control Delay	59.6	41.5	4.0	52.8	40.5	8.5	76.1	32.8	24.2	69.8	49.5	
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	59.6	41.5	4.0	52.8	40.5	8.5	76.1	32.8	24.2	69.8	49.5	
Queue Length 50th (ft)	64	236	0	136	301	28	82	143	37	78	212	
Queue Length 95th (ft)	#145	350	23	#234	438	86	#201	236	#202	#162	#385	
Internal Link Dist (ft)		596			740			529			488	
Turn Bay Length (ft)	115		150	250		150	150		150	200		
Base Capacity (vph)	181	701	495	548	807	756	169	616	433	292	547	
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	0.59	0.61	0.23	0.80	0.68	0.35	0.80	0.46	0.73	0.85	0.73	

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Walnut Ave & El Camino Real

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	98	396	103	404	505	240	124	263	292	229	263	103
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.74	1.00		0.62	1.00		0.82
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	107	430	112	439	549	261	135	286	317	249	286	112
Adj No. of Lanes	1	1	1	2	1	1	1	1	1	2	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	134	603	354	486	726	458	161	545	285	278	338	132
Arrive On Green	0.08	0.32	0.32	0.14	0.39	0.39	0.09	0.29	0.29	0.08	0.28	0.28
Sat Flow, veh/h	1774	1863	1094	3442	1863	1177	1774	1863	975	3442	1194	468
Grp Volume(v), veh/h	107	430	112	439	549	261	135	286	317	249	0	398
Grp Sat Flow(s),veh/h/ln	1774	1863	1094	1721	1863	1177	1774	1863	975	1721	0	1662
Q Serve(g_s), s	5.9	20.1	7.6	12.4	25.3	17.2	7.4	12.7	29.0	7.1	0.0	22.4
Cycle Q Clear(g_c), s	5.9	20.1	7.6	12.4	25.3	17.2	7.4	12.7	29.0	7.1	0.0	22.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	134	603	354	486	726	458	161	545	285	278	0	470
V/C Ratio(X)	0.80	0.71	0.32	0.90	0.76	0.57	0.84	0.52	1.11	0.90	0.00	0.85
Avail Cap(c_a), veh/h	161	620	364	486	726	458	161	545	285	278	0	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.1	29.5	25.2	41.9	26.2	23.7	44.3	29.3	35.0	45.1	0.0	33.5
Incr Delay (d2), s/veh	20.5	3.7	0.5	20.0	4.6	1.7	30.4	0.9	86.5	28.9	0.0	13.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	3.6	10.9	2.4	7.3	13.9	5.8	5.0	6.7	14.6	4.5	0.0	12.0
LnGrp Delay(d),s/veh	65.5	33.2	25.7	61.9	30.8	25.4	74.7	30.2	121.5	74.0	0.0	47.0
LnGrp LOS	E	C	C	E	C	C	E	C	F	E		D
Approach Vol, veh/h		649			1249			738			647	
Approach Delay, s/veh		37.2			40.6			77.6			57.4	
Approach LOS		D			D			E			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	33.0	18.0	36.1	13.0	32.0	11.5	42.6				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	8.0	29.0	14.0	33.0	9.0	28.0	9.0	38.0				
Max Q Clear Time (g_c+I1), s	9.1	31.0	14.4	22.1	9.4	24.4	7.9	27.3				
Green Ext Time (p_c), s	0.0	0.0	0.0	5.3	0.0	2.1	0.0	6.1				
Intersection Summary												
HCM 2010 Ctrl Delay			51.5									
HCM 2010 LOS			D									

WALNUT AVENUE AT EL CAMINO REAL

Sidra Outputs

LANE SUMMARY

 Site: 2014 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: El Camino Real													
Lane 1 ^d	264	2.0	939	0.281	100	6.7	LOS A	1.3	32.6	Full	1600	0.0	0.0
Approach	264	2.0		0.281		6.7	LOS A	1.3	32.6				
East: Walnut Ave													
Lane 1 ^d	324	2.0	1199	0.270	100	5.5	LOS A	1.4	35.5	Full	1600	0.0	0.0
Lane 2	80	2.0	1199	0.067	100	3.6	LOS A	0.3	7.2	Short	100	0.0	0.0
Approach	404	2.0		0.270		5.1	LOS A	1.4	35.5				
North: El Camino Real													
Lane 1 ^d	201	2.0	965	0.208	100	5.8	LOS A	1.0	24.4	Full	1600	0.0	0.0
Approach	201	2.0		0.208		5.8	LOS A	1.0	24.4				
West: Walnut Ave													
Lane 1 ^d	292	2.0	986	0.297	100	6.7	LOS A	1.5	37.1	Full	1600	0.0	0.0
Approach	292	2.0		0.297		6.7	LOS A	1.5	37.1				
Intersection	1162	2.0		0.297		6.0	LOS A	1.5	37.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2014 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: El Camino Real													
Lane 1 ^d	468	2.0	798	0.587	100	13.7	LOS B	4.0	100.8	Full	1200	0.0	0.0
Approach	468	2.0		0.587		13.7	LOS B	4.0	100.8				
East: Walnut Ave													
Lane 1 ^d	642	2.0	1045	0.615	100	11.8	LOS B	5.0	126.1	Full	1600	0.0	0.0
Lane 2	177	2.0	1045	0.169	100	5.0	LOS A	0.8	19.3	Short	100	0.0	0.0
Approach	820	2.0		0.615		10.4	LOS B	5.0	126.1				
North: El Camino Real													
Lane 1 ^d	404	2.0	687	0.588	100	15.4	LOS C	3.9	98.7	Full	1300	0.0	0.0
Approach	404	2.0		0.588		15.4	LOS C	3.9	98.7				
West: Walnut Ave													
Lane 1 ^d	421	2.0	713	0.590	100	15.0	LOS B	3.9	100.2	Full	600	0.0	0.0
Approach	421	2.0		0.590		15.0	LOS B	3.9	100.2				
Intersection	2113	2.0		0.615		13.0	LOS B	5.0	126.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: El Camino Real													
Lane 1 ^d	430	2.0	775	0.556	100	13.1	LOS B	3.5	89.3	Full	1600	0.0	0.0
Approach	430	2.0		0.556		13.1	LOS B	3.5	89.3				
East: Walnut Ave													
Lane 1 ^d	424	2.0	1016	0.417	100	8.1	LOS A	2.3	58.8	Full	1600	0.0	0.0
Lane 2	138	2.0	1016	0.136	100	4.8	LOS A	0.6	15.0	Short	100	0.0	0.0
Approach	562	2.0		0.417		7.3	LOS A	2.3	58.8				
North: El Camino Real													
Lane 1 ^d	451	2.0	817	0.552	100	12.5	LOS B	3.7	95.0	Full	1600	0.0	0.0
Approach	451	2.0		0.552		12.5	LOS B	3.7	95.0				
West: Walnut Ave													
Lane 1 ^d	425	2.0	782	0.544	100	12.7	LOS B	3.5	89.3	Full	1600	0.0	0.0
Approach	425	2.0		0.544		12.7	LOS B	3.5	89.3				
Intersection	1868	2.0		0.556		11.1	LOS B	3.7	95.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: El Camino Real													
Lane 1 ^d	666	2.0	679	0.982	100	54.7	LOS F	19.2	488.4	Full	1600	0.0	0.0
Approach	666	2.0		0.982		54.7	LOS F	19.2	488.4				
East: Walnut Ave													
Lane 1 ^d	899	2.0	873	1.030	100	60.1	LOS F	34.1	867.1	Full	1600	0.0	0.0
Lane 2	240	2.0	873	0.275	100	7.1	LOS A	1.3	32.2	Short	100	0.0	0.0
Approach	1139	2.0		1.030		49.0	LOS E	34.1	867.1				
North: El Camino Real													
Lane 1 ^d	584	2.0	516	1.131	100	108.0	LOS F	33.5	851.1	Full	1600	0.0	0.0
Approach	584	2.0		1.131		108.0	LOS F	33.5	851.1				
West: Walnut Ave													
Lane 1 ^d	587	2.0	605	0.971	100	55.6	LOS F	16.5	418.4	Full	1600	0.0	0.0
Approach	587	2.0		0.971		55.6	LOS F	16.5	418.4				
Intersection	2976	2.0		1.131		63.1	LOS F	34.1	867.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed Alt AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: El Camino Real													
Lane 1 ^d	260	2.0	981	0.265	100	6.3	LOS A	1.3	31.8	Full	1600	0.0	0.0
Lane 2	171	2.0	929	0.184	69 ⁵	5.7	LOS A	0.9	22.4	Short	200	0.0	0.0
Approach	430	2.0		0.265		6.1	LOS A	1.3	31.8				
East: Walnut Ave													
Lane 1 ^d	377	2.0	1222	0.308	100	5.8	LOS A	1.7	42.0	Full	1600	0.0	0.0
Lane 2	185	2.0	1185	0.156	51 ⁶	4.4	LOS A	0.8	20.2	Short	200	0.0	0.0
Approach	562	2.0		0.308		5.3	LOS A	1.7	42.0				
North: El Camino Real													
Lane 1 ^d	305	2.0	983	0.310	100	6.9	LOS A	1.5	38.5	Full	1600	0.0	0.0
Lane 2	146	2.0	931	0.157	51 ⁶	5.4	LOS A	0.7	18.9	Short	200	0.0	0.0
Approach	451	2.0		0.310		6.4	LOS A	1.5	38.5				
West: Walnut Ave													
Lane 1 ^d	288	2.0	955	0.301	100	6.9	LOS A	1.4	36.7	Full	1600	0.0	0.0
Lane 2	137	2.0	901	0.152	51 ⁶	5.5	LOS A	0.7	18.1	Short	200	0.0	0.0
Approach	425	2.0		0.301		6.4	LOS A	1.4	36.7				
Intersection	1868	2.0		0.310		6.0	LOS A	1.7	42.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁵ Lane under-utilisation found by the program

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed Alt PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: El Camino Real													
Lane 1 ^d	370	2.0	837	0.441	100	9.9	LOS A	2.4	62.2	Full	1600	0.0	0.0
Lane 2	297	2.0	779	0.381	86 ⁵	9.3	LOS A	2.0	51.9	Short	200	0.0	0.0
Approach	666	2.0		0.441		9.6	LOS A	2.4	62.2				
East: Walnut Ave													
Lane 1 ^d	768	2.0	1061	0.724	100	15.4	LOS C	7.7	196.3	Full	1600	0.0	0.0
Lane 2	371	2.0	1013	0.366	51 ⁶	7.4	LOS A	2.1	52.7	Short	200	0.0	0.0
Approach	1139	2.0		0.724		12.8	LOS B	7.7	196.3				
North: El Camino Real													
Lane 1 ^d	401	2.0	634	0.632	100	18.1	LOS C	4.1	103.8	Full	1600	0.0	0.0
Lane 2	183	2.0	572	0.320	51 ⁶	10.8	LOS B	1.5	37.2	Short	200	0.0	0.0
Approach	584	2.0		0.632		15.8	LOS C	4.1	103.8				
West: Walnut Ave													
Lane 1 ^d	401	2.0	707	0.568	100	14.4	LOS B	3.5	89.8	Full	1600	0.0	0.0
Lane 2	185	2.0	646	0.287	51 ⁶	9.2	LOS A	1.3	33.1	Short	200	0.0	0.0
Approach	587	2.0		0.568		12.8	LOS B	3.5	89.8				
Intersection	2976	2.0		0.724		12.7	LOS B	7.7	196.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁵ Lane under-utilisation found by the program

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2045 Proposed Alt AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: El Camino Real													
Lane 1 ^d	320	2.0	893	0.358	100	8.0	LOS A	1.8	44.6	Full	1600	0.0	0.0
Lane 2	179	2.0	837	0.214	60 ⁵	6.5	LOS A	1.0	25.8	Short	200	0.0	0.0
Approach	499	2.0		0.358		7.5	LOS A	1.8	44.6				
East: Walnut Ave													
Lane 1 ^d	417	2.0	1138	0.367	100	6.8	LOS A	2.0	50.9	Full	1600	0.0	0.0
Lane 2	203	2.0	1096	0.186	51 ⁶	5.0	LOS A	0.9	23.9	Short	200	0.0	0.0
Approach	621	2.0		0.367		6.2	LOS A	2.0	50.9				
North: El Camino Real													
Lane 1 ^d	387	2.0	927	0.417	100	8.7	LOS A	2.3	58.0	Full	1600	0.0	0.0
Lane 2	184	2.0	872	0.211	51 ⁶	6.3	LOS A	1.0	25.7	Short	200	0.0	0.0
Approach	571	2.0		0.417		7.9	LOS A	2.3	58.0				
West: Walnut Ave													
Lane 1 ^d	332	2.0	865	0.384	100	8.6	LOS A	2.0	49.8	Full	1600	0.0	0.0
Lane 2	157	2.0	808	0.194	51 ⁶	6.5	LOS A	0.9	22.9	Short	200	0.0	0.0
Approach	489	2.0		0.384		8.0	LOS A	2.0	49.8				
Intersection	2179	2.0		0.417		7.4	LOS A	2.3	58.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁵ Lane under-utilisation found by the program

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2045 Proposed Alt PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: El Camino Real													
Lane 1 ^d	421	2.0	782	0.538	100	12.5	LOS B	3.4	85.4	Full	1600	0.0	0.0
Lane 2	317	2.0	721	0.440	82 ⁵	11.1	LOS B	2.5	63.9	Short	200	0.0	0.0
Approach	738	2.0		0.538		11.9	LOS B	3.4	85.4				
East: Walnut Ave													
Lane 1 ^d	844	2.0	991	0.852	100	24.6	LOS C	12.6	319.4	Full	1600	0.0	0.0
Lane 2	405	2.0	939	0.431	51 ⁶	8.9	LOS A	2.6	66.3	Short	200	0.0	0.0
Approach	1249	2.0		0.852		19.5	LOS C	12.6	319.4				
North: El Camino Real													
Lane 1 ^d	446	2.0	574	0.777	100	28.6	LOS D	6.1	155.7	Full	1600	0.0	0.0
Lane 2	201	2.0	512	0.393	51 ⁶	13.5	LOS B	1.9	48.3	Short	200	0.0	0.0
Approach	647	2.0		0.777		23.9	LOS C	6.1	155.7				
West: Walnut Ave													
Lane 1 ^d	445	2.0	658	0.677	100	19.5	LOS C	4.8	121.7	Full	1600	0.0	0.0
Lane 2	204	2.0	595	0.342	51 ⁶	10.9	LOS B	1.6	41.4	Short	200	0.0	0.0
Approach	649	2.0		0.677		16.8	LOS C	4.8	121.7				
Intersection	3283	2.0		0.852		18.1	LOS C	12.6	319.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁵ Lane under-utilisation found by the program

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

Regional Intersection Control Evaluation
Section 2:

City of Gonzale

Appendix B2: Analysis Worksheets

Study Intersections:

- FIFTH STREET AT US 101 NORTHBOUND AND SOUTHBOUND RAMP TERMINALS



**FIFTH STREET AT US 101 NORTHBOUND AND SOUTHBOUND RAMP
TERMINALS**

Capital Cost Worksheet

City of Gonzalez **Capital Cost Worksheet**

GZL_01 Fifth Street at US 101

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)	
	SIGNAL (a)	ROUNDABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)			
Actual	\$ 3,494,920	\$ 4,911,096	\$ 1,416,176	\$ (223,347)	\$ 1,840,904	\$ 1,192,829	1.54	
High	\$ 3,844,412	\$ 4,419,986	\$ 575,574			\$ 352,227	5.23	
Low	\$ 3,145,428	\$ 5,402,206	\$ 2,256,778			\$ 2,033,431	0.91	
Breakeven	\$ 3,494,920	\$ 5,559,171	\$ 2,064,251			\$ 1,840,904	1.00	
Custom 1								
Custom 2								

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDABOUT
\$ -	\$ 2,000,000
\$ 435,749	\$ 2,500,000
\$ 935,749	\$ 3,000,000
\$ 1,435,749	\$ 3,500,000
\$ 1,935,749	\$ 4,000,000
\$ 2,435,749	\$ 4,500,000
\$ 2,935,749	\$ 5,000,000
\$ 3,435,749	\$ 5,500,000
\$ 3,935,749	\$ 6,000,000
\$ 4,435,749	\$ 6,500,000

Cost Sensitivity Assumptions

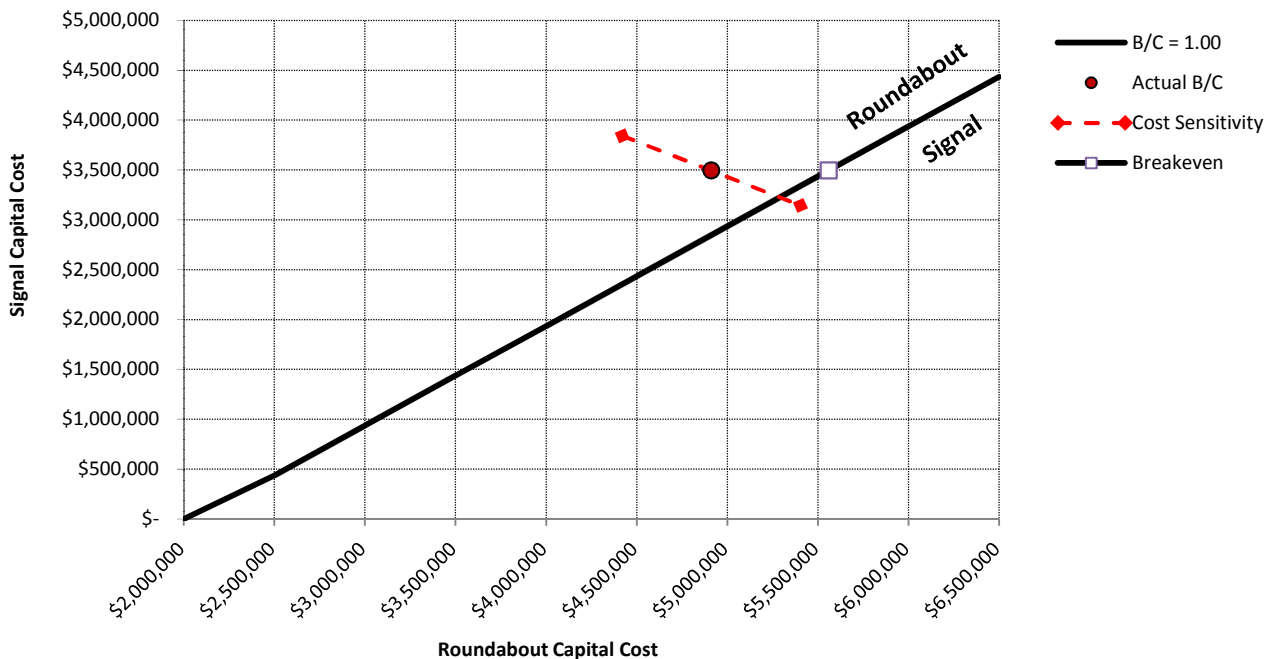
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	13%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 500,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



**FIFTH STREET AT US 101 NORTHBOUND AND SOUTHBOUND RAMP
TERMINALS**

Turning Movement Volumes

NB ramps

2013 EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2013 EXISTING												
Vehicles	25	2	72	0	419	253	0	0	0	123	268	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Pedestrians	0		0	84		150	8		0	150		84
Bicycles												

2013 EXISTING												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2013 EXISTING												
Vehicles	61	0	108	0	363	106	0	0	0	42	504	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Pedestrians	0		2	20		42	2		0	42		20
Bicycles												

Source: Fehr & Peers, March 2014

2035 CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2035 CUMULATIVE												
Vehicles	35	3	100	0	582	352	0	0	0	171	376	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Pedestrians	0		0	84		150	8		0	150		84
Bicycles												

2035 CUMULATIVE												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2035 CUMULATIVE												
Vehicles	85	1	150	0	510	148	0	0	0	59	704	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Pedestrians	0		2	20		42	2		0	42		20
Bicycles												

Source: Fehr & Peers, March 2014

SB ramps

2013 EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2013 EXISTING												
Vehicles	0	0	0	94	350	0	59	1	22	0	335	42
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Pedestrians	2		0	84		20	0		0	150		84
Bicycles												

2013 EXISTING												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2013 EXISTING												
Vehicles	0	0	0	124	304	0	235	1	74	0	314	37
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Pedestrians	2		0	20		42	0		2	42		20
Bicycles												

Source: Fehr & Peers, March 2014

2035 CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2035 CUMULATIVE												
Vehicles	0	0	0	131	486	0	82	1	31	0	465	59
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Pedestrians	2		0	84		20	0		0	150		84
Bicycles												

2035 CUMULATIVE												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
2035 CUMULATIVE												
Vehicles	0	0	0	173	422	0	327	2	103	0	436	52
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Pedestrians	2		0	20		42	0		2	42		20
Bicycles												

Source: Fehr & Peers, March 2014

**FIFTH STREET AT US 101 NORTHBOUND AND SOUTHBOUND RAMP
TERMINALS**

Synchro Outputs

Intersection												
Intersection Delay, s/veh	14.1											
Intersection LOS	B											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	123	268	0	0	0	419	253	0	25	2	72
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	5	5	5	2	5	5	5	2	5	5	5
Mvmt Flow	0	134	291	0	0	0	455	275	0	27	2	78
Number of Lanes	0	1	1	0	0	0	1	1	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	12.5	15.6	10.3
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	93%	0%	100%	0%	0%	0%
Vol Thru, %	7%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	27	72	123	268	419	253
LT Vol	25	0	123	0	0	0
Through Vol	2	0	0	268	419	0
RT Vol	0	72	0	0	0	253
Lane Flow Rate	29	78	134	291	455	275
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.062	0.139	0.232	0.464	0.679	0.356
Departure Headway (Hd)	7.577	6.394	6.242	5.737	5.473	4.767
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	475	563	578	632	665	759
Service Time	5.29	4.106	3.951	3.446	3.173	2.467
HCM Lane V/C Ratio	0.061	0.139	0.232	0.46	0.684	0.362
HCM Control Delay	10.8	10.1	10.8	13.3	18.9	10.1
HCM Lane LOS	B	B	B	B	C	B
HCM 95th-tile Q	0.2	0.5	0.9	2.5	5.3	1.6

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	5	5	5
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	0	0

Approach

Opposing Approach
 Opposing Lanes
 Conflicting Approach Left
 Conflicting Lanes Left
 Conflicting Approach Right
 Conflicting Lanes Right
 HCM Control Delay
 HCM LOS

Lane

Intersection

Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	335	42	0	94	350	0	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
Heavy Vehicles, %	2	5	5	5	2	5	5	5	2	5	5	5
Mvmt Flow	0	0	364	46	0	102	380	0	0	0	0	0
Number of Lanes	0	0	1	0	0	1	1	0	0	0	0	0

Approach

	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	2	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	2
HCM Control Delay	16	13.1
HCM LOS	C	B

Lane

	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	100%	0%
Vol Thru, %	89%	0%	100%	0%	0%
Vol Right, %	11%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	377	94	350	59	2
LT Vol	0	94	0	59	0
Through Vol	335	0	350	0	0
RT Vol	42	0	0	0	2
Lane Flow Rate	410	102	380	64	2
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.6	0.161	0.547	0.128	0.004
Departure Headway (Hd)	5.273	5.677	5.173	7.163	5.944
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	680	629	696	497	596
Service Time	3.326	3.43	2.926	4.961	3.74
HCM Lane V/C Ratio	0.603	0.162	0.546	0.129	0.003
HCM Control Delay	16	9.5	14.1	11	8.8
HCM Lane LOS	C	A	B	B	A
HCM 95th-tile Q	4	0.6	3.3	0.4	0

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	59	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	5	5	5
Mvmt Flow	0	64	0	2
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.9
HCM LOS	B

Lane

Intersection												
Intersection Delay, s/veh	25.1											
Intersection LOS	D											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	42	504	0	0	0	363	106	0	61	0	108
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	5	5	5	2	5	5	5	2	5	5	5
Mvmt Flow	0	46	548	0	0	0	395	115	0	66	0	117
Number of Lanes	0	1	1	0	0	0	1	1	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	36.3	17	11.4
HCM LOS	E	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	61	108	42	504	363	106
LT Vol	61	0	42	0	0	0
Through Vol	0	0	0	504	363	0
RT Vol	0	108	0	0	0	106
Lane Flow Rate	66	117	46	548	395	115
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.144	0.215	0.081	0.891	0.653	0.168
Departure Headway (Hd)	7.805	6.58	6.361	5.854	5.96	5.25
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	459	545	563	619	604	682
Service Time	5.562	4.336	4.102	3.595	3.704	2.994
HCM Lane V/C Ratio	0.144	0.215	0.082	0.885	0.654	0.169
HCM Control Delay	11.9	11.1	9.7	38.5	19.3	9.1
HCM Lane LOS	B	B	A	E	C	A
HCM 95th-tile Q	0.5	0.8	0.3	10.7	4.8	0.6

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	5	5	5
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	0	0

Approach

Opposing Approach
 Opposing Lanes
 Conflicting Approach Left
 Conflicting Lanes Left
 Conflicting Approach Right
 Conflicting Lanes Right
 HCM Control Delay
 HCM LOS

Lane

Intersection												
Intersection Delay, s/veh	18.1											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	314	37	0	124	304	0	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
Heavy Vehicles, %	2	5	5	5	2	5	5	5	2	5	5	5
Mvmt Flow	0	0	341	40	0	135	330	0	0	0	0	0
Number of Lanes	0	0	1	0	0	1	1	0	0	0	0	0

Approach	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	2	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	2
HCM Control Delay	22	16.2
HCM LOS	C	C

Lane	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	100%	0%
Vol Thru, %	89%	0%	100%	0%	1%
Vol Right, %	11%	0%	0%	0%	99%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	351	124	304	235	75
LT Vol	0	124	0	235	0
Through Vol	314	0	304	0	1
RT Vol	37	0	0	0	74
Lane Flow Rate	382	135	330	255	82
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.678	0.258	0.586	0.529	0.141
Departure Headway (Hd)	6.401	6.896	6.387	7.451	6.237
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	565	519	562	483	572
Service Time	4.461	4.661	4.152	5.214	4
HCM Lane V/C Ratio	0.676	0.26	0.587	0.528	0.143
HCM Control Delay	22	12.1	17.9	18.3	10
HCM Lane LOS	C	B	C	C	A
HCM 95th-tile Q	5.1	1	3.8	3	0.5

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	235	1	74
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	5	5	5
Mvmt Flow	0	255	1	80
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	16.3
HCM LOS	C

Lane

Queues



















1: US-101 N Off-ramp/US-101 N On-ramp & 5th Street



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	134	291	455	275	29	78
v/c Ratio	0.53	0.19	0.20	0.33	0.18	0.36
Control Delay	47.2	1.4	7.5	2.6	33.1	13.2
Queue Delay	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	47.2	1.6	7.5	2.6	33.1	13.2
Queue Length 50th (ft)	68	11	45	0	13	0
Queue Length 95th (ft)	106	17	86	35	35	36
Internal Link Dist (ft)		155	720		820	
Turn Bay Length (ft)						165
Base Capacity (vph)	294	1512	2281	825	645	623
Starvation Cap Reductn	0	655	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	0.46	0.34	0.20	0.33	0.04	0.13

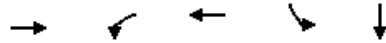
Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: US-101 N Off-ramp/US-101 N On-ramp & 5th Street

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	123	268	0	0	419	253	25	2	72	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.89	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			
Adj Sat Flow, veh/h/ln	1810	1810	0	0	1810	1810	1900	1810	1810			
Adj Flow Rate, veh/h	134	291	0	0	455	275	27	2	78			
Adj No. of Lanes	1	1	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	5	5	0	0	5	5	5	5	5			
Cap, veh/h	169	1486	0	0	2303	915	116	9	111			
Arrive On Green	0.10	0.82	0.00	0.00	0.67	0.67	0.07	0.07	0.07			
Sat Flow, veh/h	1723	1810	0	0	3529	1366	1610	119	1538			
Grp Volume(v), veh/h	134	291	0	0	455	275	29	0	78			
Grp Sat Flow(s),veh/h/ln	1723	1810	0	0	1719	1366	1729	0	1538			
Q Serve(g_s), s	5.7	2.6	0.0	0.0	3.8	6.2	1.2	0.0	3.7			
Cycle Q Clear(g_c), s	5.7	2.6	0.0	0.0	3.8	6.2	1.2	0.0	3.7			
Prop In Lane	1.00		0.00	0.00		1.00	0.93		1.00			
Lane Grp Cap(c), veh/h	169	1486	0	0	2303	915	125	0	111			
V/C Ratio(X)	0.79	0.20	0.00	0.00	0.20	0.30	0.23	0.00	0.70			
Avail Cap(c_a), veh/h	276	1486	0	0	2303	915	646	0	574			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.99	0.99	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	33.1	1.4	0.0	0.0	4.7	5.1	32.8	0.0	34.0			
Incr Delay (d2), s/veh	8.1	0.3	0.0	0.0	0.2	0.8	0.9	0.0	7.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(-26165%),veh/ln	3.1	1.3	0.0	0.0	1.8	2.5	0.6	0.0	1.8			
LnGrp Delay(d),s/veh	41.2	1.7	0.0	0.0	4.9	6.0	33.8	0.0	41.8			
LnGrp LOS	D	A			A	A	C		D			
Approach Vol, veh/h		425			730			107				
Approach Delay, s/veh		14.2			5.3			39.6				
Approach LOS		B			A			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		65.6			11.3	54.2		9.4				
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0				
Max Green Setting (Gmax), s		39.0			12.0	23.0		28.0				
Max Q Clear Time (g_c+I1), s		4.6			7.7	8.2		5.7				
Green Ext Time (p_c), s		7.4			0.1	5.5		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay					11.2							
HCM 2010 LOS					B							

Queues

2: US-101 SB On-Ramp/US-101 SB Off-Ramp & 5th Street















Lane Group	EBT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	410	102	380	64	2
v/c Ratio	0.18	0.45	0.24	0.34	0.00
Control Delay	6.4	35.1	1.2	35.0	0.0
Queue Delay	0.0	0.0	0.2	0.0	0.0
Total Delay	6.4	35.1	1.3	35.0	0.0
Queue Length 50th (ft)	40	48	0	28	0
Queue Length 95th (ft)	68	96	33	61	0
Internal Link Dist (ft)	120		155		745
Turn Bay Length (ft)					
Base Capacity (vph)	2294	252	1555	573	788
Starvation Cap Reductn	0	0	464	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.40	0.35	0.11	0.00

Intersection Summary

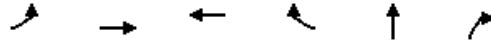
HCM 2010 Signalized Intersection Summary
 2: US-101 SB On-Ramp/US-101 SB Off-Ramp & 5th Street

TAMC Regional ICE - Gonzales
 Proposed AM (2013)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↵	↑					↵	↑	
Volume (veh/h)	0	335	42	94	350	0	0	0	0	59	0	2
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	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
Adj Sat Flow, veh/h/ln	0	1810	1900	1810	1810	0				1810	1810	1900
Adj Flow Rate, veh/h	0	364	46	102	380	0				64	0	2
Adj No. of Lanes	0	2	0	1	1	0				1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	1089	136	743	1529	0				84	0	75
Arrive On Green	0.00	0.36	0.36	0.43	0.84	0.00				0.05	0.00	0.05
Sat Flow, veh/h	0	3116	377	1723	1810	0				1723	0	1538
Grp Volume(v), veh/h	0	205	205	102	380	0				64	0	2
Grp Sat Flow(s),veh/h/ln	0	1719	1684	1723	1810	0				1723	0	1538
Q Serve(g_s), s	0.0	6.5	6.7	2.7	3.1	0.0				2.8	0.0	0.1
Cycle Q Clear(g_c), s	0.0	6.5	6.7	2.7	3.1	0.0				2.8	0.0	0.1
Prop In Lane	0.00		0.22	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	619	606	743	1529	0				84	0	75
V/C Ratio(X)	0.00	0.33	0.34	0.14	0.25	0.00				0.76	0.00	0.03
Avail Cap(c_a), veh/h	0	619	606	743	1529	0				574	0	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.99	0.99	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	17.4	17.5	12.9	1.1	0.0				35.3	0.0	34.0
Incr Delay (d2), s/veh	0.0	1.4	1.5	0.1	0.4	0.0				13.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.0	3.3	3.3	1.3	1.6	0.0				1.6	0.0	0.0
LnGrp Delay(d),s/veh	0.0	18.9	19.0	13.0	1.5	0.0				48.6	0.0	34.1
LnGrp LOS		B	B	B	A					D		C
Approach Vol, veh/h		410			482							66
Approach Delay, s/veh		18.9			4.0							48.1
Approach LOS		B			A							D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	36.4	31.0		7.6		67.4						
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0						
Max Green Setting (Gmax), s	11.0	27.0		25.0		42.0						
Max Q Clear Time (g_c+I1), s	4.7	8.7		4.8		5.1						
Green Ext Time (p_c), s	1.4	2.3		0.1		2.9						
Intersection Summary												
HCM 2010 Ctrl Delay				13.4								
HCM 2010 LOS				B								

Queues

1: US-101 N Off-ramp & 5th Street





















Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	46	548	395	115	66	117
v/c Ratio	0.27	0.37	0.16	0.11	0.34	0.43
Control Delay	47.5	2.1	5.7	2.0	34.9	11.5
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	47.5	2.3	5.7	2.0	34.9	11.5
Queue Length 50th (ft)	24	20	35	0	29	0
Queue Length 95th (ft)	m56	27	66	20	62	42
Internal Link Dist (ft)		250	1104		544	
Turn Bay Length (ft)						165
Base Capacity (vph)	275	1481	2468	1033	641	639
Starvation Cap Reductn	0	263	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	0.17	0.45	0.16	0.11	0.10	0.18

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 1: US-101 N Off-ramp & 5th Street

TAMC Regional ICE - Gonzales
 Proposed PM (2013)













												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	42	504	0	0	363	106	61	0	108	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1810	1810	0	0	1810	1810	1900	1810	1810			
Adj Flow Rate, veh/h	46	548	0	0	395	115	66	0	117			
Adj No. of Lanes	1	1	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	5	5	0	0	5	5	5	5	5			
Cap, veh/h	71	1414	0	0	2362	1024	193	0	171			
Arrive On Green	0.04	0.78	0.00	0.00	0.69	0.69	0.11	0.00	0.11			
Sat Flow, veh/h	1723	1810	0	0	3529	1491	1723	0	1530			
Grp Volume(v), veh/h	46	548	0	0	395	115	66	0	117			
Grp Sat Flow(s),veh/h/ln	1723	1810	0	0	1719	1491	1723	0	1530			
Q Serve(g_s), s	2.0	7.1	0.0	0.0	3.0	2.0	2.7	0.0	5.5			
Cycle Q Clear(g_c), s	2.0	7.1	0.0	0.0	3.0	2.0	2.7	0.0	5.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	71	1414	0	0	2362	1024	193	0	171			
V/C Ratio(X)	0.65	0.39	0.00	0.00	0.17	0.11	0.34	0.00	0.68			
Avail Cap(c_a), veh/h	276	1414	0	0	2362	1024	643	0	571			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.92	0.92	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	35.4	2.6	0.0	0.0	4.1	4.0	30.8	0.0	32.0			
Incr Delay (d2), s/veh	8.9	0.7	0.0	0.0	0.2	0.2	1.0	0.0	4.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(-26165%),veh/ln	1.1	3.8	0.0	0.0	1.5	0.9	1.3	0.0	2.6			
LnGrp Delay(d),s/veh	44.3	3.3	0.0	0.0	4.3	4.2	31.8	0.0	36.8			
LnGrp LOS	D	A			A	A	C		D			
Approach Vol, veh/h		594			510			183				
Approach Delay, s/veh		6.5			4.3			35.0				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		62.6			7.1	55.5		12.4				
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0				
Max Green Setting (Gmax), s		39.0			12.0	23.0		28.0				
Max Q Clear Time (g_c+I1), s		9.1			4.0	5.0		7.5				
Green Ext Time (p_c), s		8.2			0.0	6.8		0.6				
Intersection Summary												
HCM 2010 Ctrl Delay			9.7									
HCM 2010 LOS			A									

Queues
6: US-101 SB Off-Ramp & 5th Street

	→	↙	←	↘	↓
Lane Group	EBT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	381	135	330	255	81
v/c Ratio	0.22	0.54	0.27	0.67	0.21
Control Delay	12.6	36.0	4.6	35.2	6.8
Queue Delay	0.0	0.0	0.3	0.0	0.0
Total Delay	12.6	36.0	4.8	35.2	6.8
Queue Length 50th (ft)	51	56	2	110	0
Queue Length 95th (ft)	93	114	143	163	29
Internal Link Dist (ft)	121		250		287
Turn Bay Length (ft)					
Base Capacity (vph)	1699	275	1218	573	555
Starvation Cap Reductn	0	0	392	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.49	0.40	0.45	0.15
Intersection Summary					

HCM 2010 Signalized Intersection Summary
6: US-101 SB Off-Ramp & 5th Street

TAMC Regional ICE - Gonzales
Proposed PM (2013)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑					↖	↑	
Volume (veh/h)	0	314	37	124	304	0	0	0	0	235	1	74
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1810	1900	1810	1810	0				1810	1810	1900
Adj Flow Rate, veh/h	0	341	40	135	330	0				255	1	80
Adj No. of Lanes	0	2	0	1	1	0				1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	1072	125	533	1283	0				317	3	279
Arrive On Green	0.00	0.35	0.35	0.31	0.71	0.00				0.18	0.18	0.18
Sat Flow, veh/h	0	3183	360	1723	1810	0				1723	19	1514
Grp Volume(v), veh/h	0	188	193	135	330	0				255	0	81
Grp Sat Flow(s),veh/h/ln	0	1719	1733	1723	1810	0				1723	0	1533
Q Serve(g_s), s	0.0	6.0	6.1	4.4	4.9	0.0				10.6	0.0	3.4
Cycle Q Clear(g_c), s	0.0	6.0	6.1	4.4	4.9	0.0				10.6	0.0	3.4
Prop In Lane	0.00		0.21	1.00		0.00				1.00		0.99
Lane Grp Cap(c), veh/h	0	596	601	533	1283	0				317	0	282
V/C Ratio(X)	0.00	0.32	0.32	0.25	0.26	0.00				0.80	0.00	0.29
Avail Cap(c_a), veh/h	0	596	601	533	1283	0				574	0	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.99	0.99	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	18.0	18.0	19.4	3.9	0.0				29.3	0.0	26.4
Incr Delay (d2), s/veh	0.0	1.4	1.4	0.2	0.5	0.0				4.8	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.0	3.1	3.2	2.1	2.6	0.0				5.4	0.0	1.5
LnGrp Delay(d),s/veh	0.0	19.4	19.4	19.7	4.4	0.0				34.1	0.0	26.9
LnGrp LOS		B	B	B	A					C		C
Approach Vol, veh/h		381			465							336
Approach Delay, s/veh		19.4			8.8							32.3
Approach LOS		B			A							C
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	27.2	30.0		17.8		57.2						
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0						
Max Green Setting (Gmax), s	12.0	26.0		25.0		42.0						
Max Q Clear Time (g_c+I1), s	6.4	8.1		12.6		6.9						
Green Ext Time (p_c), s	1.2	2.2		0.9		2.7						
Intersection Summary												
HCM 2010 Ctrl Delay				18.9								
HCM 2010 LOS				B								

Queues

1: US-101 N Off-ramp/US-101 N On-ramp & 5th Street



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	186	409	633	383	41	109
v/c Ratio	0.60	0.27	0.32	0.52	0.24	0.44
Control Delay	45.9	1.9	10.1	4.3	33.6	12.7
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	45.9	2.0	10.1	4.3	33.6	12.7
Queue Length 50th (ft)	97	22	76	0	18	0
Queue Length 95th (ft)	138	31	136	50	45	42
Internal Link Dist (ft)		250	1104		544	
Turn Bay Length (ft)						165
Base Capacity (vph)	322	1502	2008	741	645	630
Starvation Cap Reductn	0	354	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	0.58	0.36	0.32	0.52	0.06	0.17

Intersection Summary

Intersection												
Intersection Delay, s/veh	32.8											
Intersection LOS	D											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	171	376	0	0	0	582	352	0	35	3	100
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	5	5	5	2	5	5	5	2	5	5	5
Mvmt Flow	0	186	409	0	0	0	633	383	0	38	3	109
Number of Lanes	0	1	1	0	0	0	1	1	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	20.3	43.3	11.7
HCM LOS	C	E	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	92%	0%	100%	0%	0%	0%
Vol Thru, %	8%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	38	100	171	376	582	352
LT Vol	35	0	171	0	0	0
Through Vol	3	0	0	376	582	0
RT Vol	0	100	0	0	0	352
Lane Flow Rate	41	109	186	409	633	383
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.094	0.214	0.353	0.718	1	0.56
Departure Headway (Hd)	8.278	7.091	6.828	6.328	5.98	5.271
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	435	508	528	572	607	685
Service Time	5.978	4.82	4.551	4.052	3.705	2.996
HCM Lane V/C Ratio	0.094	0.215	0.352	0.715	1.043	0.559
HCM Control Delay	11.8	11.7	13.2	23.6	60.7	14.5
HCM Lane LOS	B	B	B	C	F	B
HCM 95th-tile Q	0.3	0.8	1.6	5.9	15	3.5

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	5	5	5
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	0	0

Approach

Opposing Approach

Opposing Lanes

Conflicting Approach Left

Conflicting Lanes Left

Conflicting Approach Right

Conflicting Lanes Right

HCM Control Delay

HCM LOS

Lane

Intersection												
Intersection Delay, s/veh	32.3											
Intersection LOS	D											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	465	59	0	131	486	0	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
Heavy Vehicles, %	2	5	5	5	2	5	5	5	2	5	5	5
Mvmt Flow	0	0	505	64	0	142	528	0	0	0	0	0
Number of Lanes	0	0	1	0	0	1	1	0	0	0	0	0

Approach	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	2	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	2
HCM Control Delay	43	26.9
HCM LOS	E	D

Lane	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	100%	0%
Vol Thru, %	89%	0%	100%	0%	0%
Vol Right, %	11%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	524	131	486	82	31
LT Vol	0	131	0	82	0
Through Vol	465	0	486	0	0
RT Vol	59	0	0	0	31
Lane Flow Rate	570	142	528	89	34
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.919	0.246	0.839	0.2	0.064
Departure Headway (Hd)	5.811	6.228	5.721	8.08	6.848
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	627	578	634	445	523
Service Time	3.84	3.957	3.45	5.825	4.592
HCM Lane V/C Ratio	0.909	0.246	0.833	0.2	0.065
HCM Control Delay	43	11	31.2	12.8	10.1
HCM Lane LOS	E	B	D	B	B
HCM 95th-tile Q	11.8	1	9.1	0.7	0.2

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	82	0	31
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	5	5	5
Mvmt Flow	0	89	0	34
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	12.1
HCM LOS	B

Lane

Intersection												
Intersection Delay, s/veh	48.2											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	59	704	0	0	0	510	148	0	85	0	150
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	5	5	5	2	5	5	5	2	5	5	5
Mvmt Flow	0	64	765	0	0	0	554	161	0	92	0	163
Number of Lanes	0	1	1	0	0	0	1	1	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	59.6	47.6	13.1
HCM LOS	F	E	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	85	150	59	704	510	148
LT Vol	85	0	59	0	0	0
Through Vol	0	0	0	704	510	0
RT Vol	0	150	0	0	0	148
Lane Flow Rate	92	163	64	765	554	161
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.212	0.319	0.126	1	0.982	0.254
Departure Headway (Hd)	8.244	7.045	7.053	6.543	6.378	5.678
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	437	512	509	559	571	634
Service Time	5.966	4.767	4.793	4.283	4.102	3.402
HCM Lane V/C Ratio	0.211	0.318	0.126	1.369	0.97	0.254
HCM Control Delay	13.2	13	10.8	63.7	58.4	10.3
HCM Lane LOS	B	B	B	F	F	B
HCM 95th-tile Q	0.8	1.4	0.4	14.3	13.8	1

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	5	5	5
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	0	0

Approach

Opposing Approach

Opposing Lanes

Conflicting Approach Left

Conflicting Lanes Left

Conflicting Approach Right

Conflicting Lanes Right

HCM Control Delay

HCM LOS

Lane

Intersection												
Intersection Delay, s/veh	46.9											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	436	52	0	173	422	0	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
Heavy Vehicles, %	2	5	5	5	2	5	5	5	2	5	5	5
Mvmt Flow	0	0	474	57	0	188	459	0	0	0	0	0
Number of Lanes	0	0	1	0	0	1	1	0	0	0	0	0

Approach	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	2	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	2
HCM Control Delay	67.9	41.1
HCM LOS	F	E

Lane	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	100%	0%
Vol Thru, %	89%	0%	100%	0%	2%
Vol Right, %	11%	0%	0%	0%	98%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	488	173	422	327	105
LT Vol	0	173	0	327	0
Through Vol	436	0	422	0	2
RT Vol	52	0	0	0	103
Lane Flow Rate	530	188	459	355	114
Geometry Grp	6	7	7	7	7
Degree of Util (X)	1	0.407	0.928	0.807	0.221
Departure Headway (Hd)	7.299	7.787	7.286	8.17	6.984
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	499	463	500	444	515
Service Time	5.368	5.534	5.033	5.904	4.718
HCM Lane V/C Ratio	1.062	0.406	0.918	0.8	0.221
HCM Control Delay	67.9	15.8	51.5	37.2	11.7
HCM Lane LOS	F	C	F	E	B
HCM 95th-tile Q	13.5	1.9	11	7.4	0.8

Intersection

Intersection Delay, s/veh
 Intersection LOS



















Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	327	2	103
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	5	5	5
Mvmt Flow	0	355	2	112
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	31
HCM LOS	D

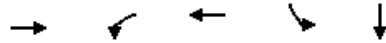
Lane

HCM 2010 Signalized Intersection Summary
 1: US-101 N Off-ramp/US-101 N On-ramp & 5th Street

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	171	376	0	0	582	352	35	3	100	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.84	1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1810	1810	0	0	1810	1810	1900	1810	1810			
Adj Flow Rate, veh/h	186	409	0	0	633	383	38	3	109			
Adj No. of Lanes	1	1	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	5	5	0	0	5	5	5	5	5			
Cap, veh/h	224	1380	0	0	1992	745	209	17	195			
Arrive On Green	0.13	0.76	0.00	0.00	0.58	0.58	0.13	0.13	0.13			
Sat Flow, veh/h	1723	1810	0	0	3529	1286	1603	127	1496			
Grp Volume(v), veh/h	186	409	0	0	633	383	41	0	109			
Grp Sat Flow(s),veh/h/ln	1723	1810	0	0	1719	1286	1729	0	1496			
Q Serve(g_s), s	7.9	5.2	0.0	0.0	7.1	13.4	1.6	0.0	5.1			
Cycle Q Clear(g_c), s	7.9	5.2	0.0	0.0	7.1	13.4	1.6	0.0	5.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.93		1.00			
Lane Grp Cap(c), veh/h	224	1380	0	0	1992	745	226	0	195			
V/C Ratio(X)	0.83	0.30	0.00	0.00	0.32	0.51	0.18	0.00	0.56			
Avail Cap(c_a), veh/h	253	1380	0	0	1992	745	646	0	558			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.97	0.97	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.8	2.7	0.0	0.0	8.1	9.4	29.0	0.0	30.6			
Incr Delay (d2), s/veh	18.0	0.5	0.0	0.0	0.4	2.5	0.4	0.0	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(-26165%),veh/ln	4.9	2.7	0.0	0.0	3.5	5.2	0.8	0.0	2.3			
LnGrp Delay(d),s/veh	49.9	3.3	0.0	0.0	8.5	12.0	29.4	0.0	33.1			
LnGrp LOS	D	A			A	B	C		C			
Approach Vol, veh/h		595			1016			150				
Approach Delay, s/veh		17.8			9.8			32.1				
Approach LOS		B			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		61.2			13.7	47.5		13.8				
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0				
Max Green Setting (Gmax), s		39.0			11.0	24.0		28.0				
Max Q Clear Time (g_c+I1), s		7.2			9.9	15.4		7.1				
Green Ext Time (p_c), s		11.5			0.1	5.4		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			14.4									
HCM 2010 LOS			B									

Queues

2: US-101 SB On-Ramp/US-101 SB Off-Ramp & 5th Street















Lane Group	EBT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	569	142	528	89	34
v/c Ratio	0.27	0.56	0.36	0.42	0.11
Control Delay	8.7	34.3	2.2	35.6	0.8
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	8.7	34.3	2.3	35.6	0.8
Queue Length 50th (ft)	65	66	19	39	0
Queue Length 95th (ft)	107	124	87	77	0
Internal Link Dist (ft)	121		250		287
Turn Bay Length (ft)					
Base Capacity (vph)	2109	275	1459	573	584
Starvation Cap Reductn	0	0	183	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.52	0.41	0.16	0.06

Intersection Summary

HCM 2010 Signalized Intersection Summary
 2: US-101 SB On-Ramp/US-101 SB Off-Ramp & 5th Street

TAMC Regional ICE - Gonzales
 Proposed AM (2035)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑					↖	↑	
Volume (veh/h)	0	465	59	131	486	0	0	0	0	82	0	31
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.84	1.00		1.00				1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1810	1900	1810	1810	0				1810	1810	1900
Adj Flow Rate, veh/h	0	505	64	142	528	0				89	0	34
Adj No. of Lanes	0	2	0	1	1	0				1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	1039	131	702	1461	0				148	0	129
Arrive On Green	0.00	0.35	0.35	0.41	0.81	0.00				0.09	0.00	0.09
Sat Flow, veh/h	0	3089	377	1723	1810	0				1723	0	1502
Grp Volume(v), veh/h	0	288	281	142	528	0				89	0	34
Grp Sat Flow(s),veh/h/ln	0	1719	1656	1723	1810	0				1723	0	1502
Q Serve(g_s), s	0.0	9.9	10.0	4.0	5.9	0.0				3.7	0.0	1.6
Cycle Q Clear(g_c), s	0.0	9.9	10.0	4.0	5.9	0.0				3.7	0.0	1.6
Prop In Lane	0.00		0.23	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	596	574	702	1461	0				148	0	129
V/C Ratio(X)	0.00	0.48	0.49	0.20	0.36	0.00				0.60	0.00	0.26
Avail Cap(c_a), veh/h	0	596	574	702	1461	0				574	0	501
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.96	0.96	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.2	19.3	14.3	2.0	0.0				33.1	0.0	32.1
Incr Delay (d2), s/veh	0.0	2.8	3.0	0.1	0.7	0.0				3.9	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.0	5.1	5.0	1.9	3.2	0.0				1.9	0.0	0.7
LnGrp Delay(d),s/veh	0.0	22.0	22.3	14.5	2.6	0.0				36.9	0.0	33.1
LnGrp LOS		C	C	B	A					D		C
Approach Vol, veh/h		569			670							123
Approach Delay, s/veh		22.1			5.1							35.9
Approach LOS		C			A							D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	34.6	30.0		10.4		64.6						
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0						
Max Green Setting (Gmax), s	12.0	26.0		25.0		42.0						
Max Q Clear Time (g_c+I1), s	6.0	12.0		5.7		7.9						
Green Ext Time (p_c), s	2.0	3.0		0.4		4.3						
Intersection Summary												
HCM 2010 Ctrl Delay				15.0								
HCM 2010 LOS				B								

Queues

1: US-101 N Off-ramp/US-101 N On-ramp & 5th Street





















Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	64	765	554	161	92	163
v/c Ratio	0.34	0.55	0.31	0.17	0.43	0.53
Control Delay	43.0	3.2	7.8	2.1	35.6	14.8
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0
Total Delay	43.0	3.5	7.8	2.1	35.6	14.8
Queue Length 50th (ft)	33	28	74	0	40	11
Queue Length 95th (ft)	m50	100	138	26	79	61
Internal Link Dist (ft)		250	1104		544	
Turn Bay Length (ft)						165
Base Capacity (vph)	204	1389	1813	945	641	650
Starvation Cap Reductn	0	187	0	0	0	0
Spillback Cap Reductn	0	0	11	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.64	0.31	0.17	0.14	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

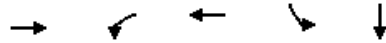
HCM 2010 Signalized Intersection Summary
 1: US-101 N Off-ramp/US-101 N On-ramp & 5th Street

TAMC Regional ICE - Gonzales
 Proposed PM (2035)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	59	704	0	0	510	148	85	0	150	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1810	1810	0	0	1810	1810	1900	1810	1810			
Adj Flow Rate, veh/h	64	765	0	0	554	161	92	0	163			
Adj No. of Lanes	1	1	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	5	5	0	0	5	5	5	5	5			
Cap, veh/h	85	1344	0	0	1761	940	259	0	230			
Arrive On Green	0.05	0.74	0.00	0.00	0.64	0.64	0.15	0.00	0.15			
Sat Flow, veh/h	1723	1810	0	0	3185	1468	1723	0	1526			
Grp Volume(v), veh/h	64	765	0	0	554	161	92	0	163			
Grp Sat Flow(s),veh/h/ln	1723	1810	0	0	1375	1468	1723	0	1526			
Q Serve(g_s), s	2.8	14.1	0.0	0.0	6.8	3.3	3.6	0.0	7.6			
Cycle Q Clear(g_c), s	2.8	14.1	0.0	0.0	6.8	3.3	3.6	0.0	7.6			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	85	1344	0	0	1761	940	259	0	230			
V/C Ratio(X)	0.76	0.57	0.00	0.00	0.31	0.17	0.35	0.00	0.71			
Avail Cap(c_a), veh/h	184	1344	0	0	1761	940	643	0	570			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.67	0.67	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	35.2	4.3	0.0	0.0	6.1	5.4	28.6	0.0	30.3			
Incr Delay (d2), s/veh	8.8	1.2	0.0	0.0	0.5	0.4	0.8	0.0	4.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(-26165%),veh/ln	1.5	7.2	0.0	0.0	2.7	1.4	1.8	0.0	3.5			
LnGrp Delay(d),s/veh	44.0	5.5	0.0	0.0	6.5	5.8	29.4	0.0	34.3			
LnGrp LOS	D	A			A	A	C		C			
Approach Vol, veh/h		829			715			255				
Approach Delay, s/veh		8.4			6.4			32.5				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		59.7			7.7	52.0		15.3				
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0				
Max Green Setting (Gmax), s		39.0			8.0	27.0		28.0				
Max Q Clear Time (g_c+I1), s		16.1			4.8	8.8		9.6				
Green Ext Time (p_c), s		11.5			0.0	10.0		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay					11.0							
HCM 2010 LOS					B							

Queues

2: US-101 SB On-Ramp/US-101 SB Off-Ramp & 5th Street















Lane Group	EBT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	531	188	459	355	114
v/c Ratio	0.64	0.68	0.41	0.76	0.23
Control Delay	23.3	41.6	7.0	35.8	5.5
Queue Delay	0.0	0.0	0.3	0.0	0.0
Total Delay	23.3	41.6	7.4	35.8	5.5
Queue Length 50th (ft)	169	82	114	148	1
Queue Length 95th (ft)	#292	#167	220	224	33
Internal Link Dist (ft)	121		250		287
Turn Bay Length (ft)					
Base Capacity (vph)	830	275	1126	573	576
Starvation Cap Reductn	0	0	246	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.64	0.68	0.52	0.62	0.20

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 2: US-101 SB On-Ramp/US-101 SB Off-Ramp & 5th Street

TAMC Regional ICE - Gonzales
 Proposed PM (2035)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↵	↑					↵	↑	
Volume (veh/h)	0	436	52	173	422	0	0	0	0	327	2	103
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1810	1900	1810	1810	0				1810	1810	1900
Adj Flow Rate, veh/h	0	474	57	188	459	0				355	2	112
Adj No. of Lanes	0	2	0	1	1	0				1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	859	103	431	1176	0				419	7	366
Arrive On Green	0.00	0.35	0.35	0.25	0.65	0.00				0.24	0.24	0.24
Sat Flow, veh/h	0	3255	297	1723	1810	0				1723	27	1503
Grp Volume(v), veh/h	0	196	335	188	459	0				355	0	114
Grp Sat Flow(s),veh/h/ln	0	1031	1742	1723	1810	0				1723	0	1530
Q Serve(g_s), s	0.0	11.5	11.6	6.9	8.9	0.0				14.7	0.0	4.6
Cycle Q Clear(g_c), s	0.0	11.5	11.6	6.9	8.9	0.0				14.7	0.0	4.6
Prop In Lane	0.00		0.17	1.00		0.00				1.00		0.98
Lane Grp Cap(c), veh/h	0	358	604	431	1176	0				419	0	372
V/C Ratio(X)	0.00	0.55	0.55	0.44	0.39	0.00				0.85	0.00	0.31
Avail Cap(c_a), veh/h	0	358	604	431	1176	0				574	0	510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.96	0.96	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.8	19.8	23.7	6.2	0.0				27.0	0.0	23.2
Incr Delay (d2), s/veh	0.0	6.0	3.6	0.7	0.9	0.0				8.5	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.0	3.9	6.2	3.4	4.6	0.0				8.0	0.0	2.0
LnGrp Delay(d),s/veh	0.0	25.7	23.4	24.3	7.1	0.0				35.5	0.0	23.7
LnGrp LOS		C	C	C	A					D		C
Approach Vol, veh/h		531			647						469	
Approach Delay, s/veh		24.3			12.1						32.6	
Approach LOS		C			B						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	22.8	30.0		22.2		52.8						
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0						
Max Green Setting (Gmax), s	12.0	26.0		25.0		42.0						
Max Q Clear Time (g_c+I1), s	8.9	13.6		16.7		10.9						
Green Ext Time (p_c), s	1.1	2.6		1.2		3.8						
Intersection Summary												
HCM 2010 Ctrl Delay			21.9									
HCM 2010 LOS			C									

**FIFTH STREET AT US 101 NORTHBOUND AND SOUTHBOUND RAMP
TERMINALS**

Sidra Outputs

LANE SUMMARY

 Site: NB_2013 Proposed AM - Final

5th St and US 101 NB ramps
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: US 101 NB ramps													
Lane 1 ^d	108	5.0	897	0.120	100	5.2	LOS A	0.5	13.0	Full	900	0.0	0.0
Approach	108	5.0		0.120		5.2	LOS A	0.5	13.0				
East: 5th St													
Lane 1 ^d	455	5.0	1178	0.386	100	6.9	LOS A	2.3	59.5	Full	800	0.0	0.0
Lane 2	275	5.0	1178	0.233	100	5.1	LOS A	1.2	30.4	Full	800	0.0	0.0
Approach	730	5.0		0.386		6.2	LOS A	2.3	59.5				
West: 5th St													
Lane 1 ^d	425	5.0	1405	0.303	100	5.2	LOS A	0.0	0.0	Full	225	0.0	0.0
Approach	425	5.0		0.303		5.2	LOS A	0.0	0.0				
Intersection	1263	5.0		0.386		5.8	LOS A	2.3	59.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: NB_2013 Proposed PM - Final

5th St and US 101 NB ramps
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: US 101 NB ramps													
Lane 1 ^d	185	5.0	762	0.242	100	7.4	LOS A	1.1	27.4	Full	900	0.0	0.0
Approach	185	5.0		0.242		7.4	LOS A	1.1	27.4				
East: 5th St													
Lane 1 ^d	395	5.0	1248	0.316	100	5.8	LOS A	1.8	46.5	Full	800	0.0	0.0
Lane 2	115	5.0	1248	0.092	100	3.6	LOS A	0.4	10.7	Full	800	0.0	0.0
Approach	510	5.0		0.316		5.3	LOS A	1.8	46.5				
West: 5th St													
Lane 1 ^d	593	5.0	1405	0.422	100	6.5	LOS A	0.0	0.0	Full	225	0.0	0.0
Approach	593	5.0		0.422		6.5	LOS A	0.0	0.0				
Intersection	1288	5.0		0.422		6.2	LOS A	1.8	46.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: SB_2013 Proposed AM - Final

5th St and US 101 SB ramps
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: 5th St													
Lane 1 ^d	483	5.0	1405	0.344	100	5.6	LOS A	0.0	0.0	Full	225	0.0	0.0
Approach	483	5.0		0.344		5.6	LOS A	0.0	0.0				
North: US 101 SB ramps													
Lane 1 ^d	89	5.0	827	0.108	100	5.4	LOS A	0.4	11.2	Full	825	0.0	0.0
Approach	89	5.0		0.108		5.4	LOS A	0.4	11.2				
West: 5th St													
Lane 1 ^d	410	5.0	1183	0.346	100	6.4	LOS A	2.0	51.3	Full	200	0.0	0.0
Approach	410	5.0		0.346		6.4	LOS A	2.0	51.3				
Intersection	982	5.0		0.346		5.9	LOS A	2.0	51.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: SB_2013 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: 5th St													
Lane 1 ^d	465	5.0	1405	0.331	100	5.5	LOS A	0.0	0.0	Full	225	0.0	0.0
Approach	465	5.0		0.331		5.5	LOS A	0.0	0.0				
North: US 101 SB ramps													
Lane 1 ^d	337	5.0	827	0.408	100	9.4	LOS A	2.0	52.4	Full	825	0.0	0.0
Approach	337	5.0		0.408		9.4	LOS A	2.0	52.4				
West: 5th St													
Lane 1 ^d	382	5.0	940	0.406	100	8.4	LOS A	2.2	56.4	Full	1300	0.0	0.0
Approach	382	5.0		0.406		8.4	LOS A	2.2	56.4				
Intersection	1184	5.0		0.408		7.5	LOS A	2.2	56.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: NB_2035 Proposed AM - Final

5th St and US 101 NB ramps
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: US 101 NB ramps													
Lane 1 ^d	150	5.0	751	0.200	100	7.0	LOS A	0.8	21.7	Full	900	0.0	0.0
Approach	150	5.0		0.200		7.0	LOS A	0.8	21.7				
East: 5th St													
Lane 1 ^d	633	5.0	1100	0.575	100	10.5	LOS B	4.2	108.4	Full	800	0.0	0.0
Lane 2	383	5.0	1100	0.348	100	6.8	LOS A	1.9	49.2	Full	800	0.0	0.0
Approach	1015	5.0		0.575		9.1	LOS A	4.2	108.4				
West: 5th St													
Lane 1 ^d	595	5.0	1405	0.423	100	6.5	LOS A	0.0	0.0	Full	225	0.0	0.0
Approach	595	5.0		0.423		6.5	LOS A	0.0	0.0				
Intersection	1760	5.0		0.575		8.0	LOS A	4.2	108.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: NB_2035 Propsoed PM - Final

5th St and US 101 NB ramps
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: US 101 NB ramps													
Lane 1 ^d	257	5.0	598	0.429	100	12.6	LOS B	2.1	55.4	Full	900	0.0	0.0
Approach	257	5.0		0.429		12.6	LOS B	2.1	55.4				
East: 5th St													
Lane 1 ^d	554	5.0	1190	0.466	100	8.0	LOS A	3.1	80.1	Full	800	0.0	0.0
Lane 2	161	5.0	1190	0.135	100	4.2	LOS A	0.6	16.1	Full	800	0.0	0.0
Approach	715	5.0		0.466		7.1	LOS A	3.1	80.1				
West: 5th St													
Lane 1 ^d	829	5.0	1405	0.590	100	9.1	LOS A	0.0	0.0	Full	225	0.0	0.0
Approach	829	5.0		0.590		9.1	LOS A	0.0	0.0				
Intersection	1801	5.0		0.590		8.8	LOS A	3.1	80.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: SB_2035 Proposed AM - Final

5th St and US 101 SB ramps
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
East: 5th St													
Lane 1 ^d	671	5.0	1405	0.477	100	7.3	LOS A	0.0	0.0	Full	225	0.0	0.0
Approach	671	5.0		0.477		7.3	LOS A	0.0	0.0				
North: US 101 SB ramps													
Lane 1 ^d	124	5.0	683	0.181	100	7.3	LOS A	0.7	18.7	Full	825	0.0	0.0
Approach	124	5.0		0.181		7.3	LOS A	0.7	18.7				
West: 5th St													
Lane 1 ^d	570	5.0	1106	0.515	100	9.2	LOS A	3.4	89.3	Full	200	0.0	0.0
Approach	570	5.0		0.515		9.2	LOS A	3.4	89.3				
Intersection	1364	5.0		0.515		8.1	LOS A	3.4	89.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: SB_2035 Proposed PM - Final

5th St and US 101 SB ramps
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
East: 5th St													
Lane 1 ^d	647	5.0	1405	0.460	100	7.0	LOS A	0.0	0.0	Full	225	0.0	0.0
Approach	647	5.0		0.460		7.0	LOS A	0.0	0.0				
North: US 101 SB ramps													
Lane 1 ^d	470	5.0	698	0.672	100	18.4	LOS C	5.0	129.7	Full	825	0.0	0.0
Approach	470	5.0		0.672		18.4	LOS C	5.0	129.7				
West: 5th St													
Lane 1 ^d	530	5.0	803	0.661	100	16.1	LOS C	5.4	140.1	Full	200	0.0	0.0
Approach	530	5.0		0.661		16.1	LOS C	5.4	140.1				
Intersection	1647	5.0		0.672		13.2	LOS B	5.4	140.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Regional Intersection Control Evaluation

Section 3:

King City

Appendix B3: Analysis Worksheets

Study Intersections:

- BROADWAY STREET AT SAN ANTONIO DRIVE / US 101 NORTHBOUND RAMP TERMINALS



**BROADWAY STREET AT SAN ANTONIO DRIVE / US 101 NORTHBOUND
RAMP TERMINALS**

Capital Cost Worksheet

King City
Capital Cost Worksheet

KGC-01E San Antonio Dr at Broadway St / US 101

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ -	\$ 2,336,735	\$ 2,336,735	\$ (95,872)	\$ 3,342,070	\$ 2,240,863	1.49
High	\$ -	\$ 2,103,062	\$ 2,103,062			\$ 2,007,190	1.67
Low	\$ -	\$ 2,570,409	\$ 2,570,409			\$ 2,474,537	1.35
Breakeven	\$ -	\$ 3,437,942	\$ 3,437,942			\$ 3,342,070	1.00
Custom 1							
Custom 2							

Capital Cost Relationship (B/C=1.00)

SIGNAL	ROUNDAABOUT
\$ -	\$ 1,500,000
\$ -	\$ 2,000,000
\$ -	\$ 2,500,000
\$ -	\$ 3,000,000
\$ -	\$ 3,500,000
\$ 562,058	\$ 4,000,000
\$ 1,062,058	\$ 4,500,000
\$ 1,562,058	\$ 5,000,000
\$ 2,062,058	\$ 5,500,000
\$ 2,562,058	\$ 6,000,000

Cost Sensitivity Assumptions

B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	47%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase \$ 500,000 (x axis major unit)

Min Signal Cost \$ 400,000 (Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS

**BROADWAY STREET AT SAN ANTONIO DRIVE / US 101 NORTHBOUND
RAMP TERMINALS**

Turning Movement Volumes

EXISTING																					
AM	NB				WB				SB				EB				WB (US-101 NB off-ramp)				
	↶	↷	↑	↷	↶	↷	↑	↷	↶	↑	↷	↷	↶	↑	↷	↷	↶	↷	↶	↑	↷
EXISTING																					
Vehicles	63	6	185	242	30	100	3	89	5	212	38	93	1	5	1	6	22	1	1	7	20
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians			2				1			4				1							
Bicycles										1											

EXISTING																					
PM	NB				WB				SB				EB				WB (US-101 NB off-ramp)				
	↶	↷	↑	↷	↶	↷	↑	↷	↶	↑	↷	↷	↶	↑	↷	↷	↶	↷	↶	↑	↷
EXISTING																					
Vehicles	68	18	238	208	64	136	5	184	2	137	44	71	1	7	1	7	38	1	1	50	12
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians			1				3			10				7							
Bicycles																					

Source: Hanna & Brunetti Dated: 2015

2030																					
AM	NB				WB				SB				EB				WB (US-101 NB off-ramp)				
	↶	↷	↑	↷	↶	↷	↑	↷	↶	↑	↷	↷	↶	↑	↷	↷	↶	↷	↶	↑	↷
2030																					
Vehicles	90	9	264	345	43	143	4	127	7	303	54	133	1	7	1	9	31	1	1	10	29
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians			2				1			4				1							
Bicycles										1											

2030																					
PM	NB				WB				SB				EB				WB (US-101 NB off-ramp)				
	↶	↷	↑	↷	↶	↷	↑	↷	↶	↑	↷	↷	↶	↑	↷	↷	↶	↷	↶	↑	↷
2030																					
Vehicles	97	26	340	297	91	194	7	263	3	196	63	101	1	10	1	10	54	1	1	71	17
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians			1				3			10				7							
Bicycles																					

Source: Kittelson & Associates, Inc. (2.4% Growth Rate) Dated: 2015

2040																					
AM	NB				WB				SB				EB				WB (US-101 NB off-ramp)				
	↶	↷	↑	↷	↶	↷	↑	↷	↶	↑	↷	↷	↶	↑	↷	↷	↶	↷	↶	↑	↷
2040																					
Vehicles	114	11	335	438	54	181	5	161	9	384	69	168	2	9	2	11	40	2	2	13	36
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians			2				1			4				1							
Bicycles										1											

2040																					
PM	NB				WB				SB				EB				WB (US-101 NB off-ramp)				
	↶	↷	↑	↷	↶	↷	↑	↷	↶	↑	↷	↷	↶	↑	↷	↷	↶	↷	↶	↑	↷
2040																					
Vehicles	123	33	431	376	116	246	9	333	4	248	80	128	2	13	2	13	69	2	2	90	22
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians			1				3			10				7							
Bicycles																					

**BROADWAY STREET AT SAN ANTONIO DRIVE / US 101 NORTHBOUND
RAMP TERMINALS**

Synchro Outputs

Queues

1: San Lorenzo Dr/Broadway St & San Antonio Dr



Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	14	141	3	97	8	209	285	5	373
v/c Ratio	0.06	0.34	0.01	0.22	0.02	0.24	0.53	0.01	0.44
Control Delay	20.2	21.3	19.3	7.1	18.0	17.9	10.4	17.8	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	21.3	19.3	7.1	18.0	17.9	10.4	17.8	17.2
Queue Length 50th (ft)	1	29	1	0	2	22	15	1	35
Queue Length 95th (ft)	19	105	8	35	13	68	93	10	107
Internal Link Dist (ft)	124		262			46			196
Turn Bay Length (ft)				82			25	95	
Base Capacity (vph)	1001	965	1015	895	965	1929	938	667	1293
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.15	0.00	0.11	0.01	0.11	0.30	0.01	0.29

Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: San Lorenzo Dr/Broadway St & San Antonio Dr

TAMC Regional ICE - King City
 Existing AM (2015)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↖	↗	↗	↕	↗	↗	↕	↕
Volume (veh/h)	1	5	7	130	3	89	7	192	262	5	250	93
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.99	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	1	5	8	141	3	97	8	209	285	5	272	101
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	15	24	347	364	309	479	956	425	336	478	173
Arrive On Green	0.03	0.03	0.03	0.20	0.20	0.20	0.27	0.27	0.27	0.19	0.19	0.19
Sat Flow, veh/h	120	601	962	1774	1863	1581	1774	3539	1572	1774	2525	911
Grp Volume(v), veh/h	14	0	0	141	3	97	8	209	285	5	188	185
Grp Sat Flow(s),veh/h/ln	1684	0	0	1774	1863	1581	1774	1770	1572	1774	1770	1666
Q Serve(g_s), s	0.4	0.0	0.0	3.5	0.1	2.6	0.2	2.3	8.1	0.1	4.8	5.1
Cycle Q Clear(g_c), s	0.4	0.0	0.0	3.5	0.1	2.6	0.2	2.3	8.1	0.1	4.8	5.1
Prop In Lane	0.07		0.57	1.00		1.00	1.00		1.00	1.00		0.55
Lane Grp Cap(c), veh/h	42	0	0	347	364	309	479	956	425	336	335	316
V/C Ratio(X)	0.33	0.00	0.00	0.41	0.01	0.31	0.02	0.22	0.67	0.01	0.56	0.59
Avail Cap(c_a), veh/h	943	0	0	923	969	822	923	1841	817	639	637	600
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.0	0.0	0.0	17.6	16.2	17.2	13.4	14.1	16.3	16.5	18.4	18.5
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.1	0.0	0.8	0.0	0.2	2.6	0.0	2.1	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.2	0.0	0.0	1.8	0.0	1.2	0.1	1.1	3.8	0.1	2.5	2.5
LnGrp Delay(d),s/veh	25.7	0.0	0.0	18.7	16.2	18.1	13.4	14.3	18.9	16.5	20.5	20.9
LnGrp LOS	C			B	B	B	B	B	B	B	C	C
Approach Vol, veh/h		14			241			502			378	
Approach Delay, s/veh		25.7			18.4			16.9			20.6	
Approach LOS		C			B			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		13.5		5.3		17.5		13.8				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		18.0		28.0		26.0		26.0				
Max Q Clear Time (g_c+I1), s		7.1		2.4		10.1		5.5				
Green Ext Time (p_c), s		2.2		0.0		3.1		1.1				
Intersection Summary												
HCM 2010 Ctrl Delay				18.6								
HCM 2010 LOS				B								

Intersection

Int Delay, s/veh 1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	0	22	1	28	63	433	0	0	243	143
Future Vol, veh/h	0	0	0	22	1	28	63	433	0	0	243	143
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
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	0	0	0	24	1	30	68	471	0	0	264	155

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	872	872	471	264	0	0	471	0	0
Stage 1	608	608	-	-	-	-	-	-	-
Stage 2	264	264	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	321	289	593	1300	-	-	1091	-	-
Stage 1	543	486	-	-	-	-	-	-	-
Stage 2	780	690	-	-	-	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	298	0	593	1300	-	-	1091	-	-
Mov Cap-2 Maneuver	298	0	-	-	-	-	-	-	-
Stage 1	504	0	-	-	-	-	-	-	-
Stage 2	780	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1300	-	-	413	1091	-	-
HCM Lane V/C Ratio	0.053	-	-	0.134	-	-	-
HCM Control Delay (s)	7.9	0	-	15.1	0	-	-
HCM Lane LOS	A	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0	-	-

Queues

1: San Lorenzo Dr/Broadway St & San Antonio Dr















Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	18	217	5	200	21	313	239	2	274
v/c Ratio	0.08	0.46	0.01	0.36	0.05	0.34	0.49	0.01	0.37
Control Delay	23.2	22.2	18.6	5.8	19.3	19.2	14.4	23.0	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	22.2	18.6	5.8	19.3	19.2	14.4	23.0	19.2
Queue Length 50th (ft)	2	48	1	0	4	35	26	1	27
Queue Length 95th (ft)	25	160	10	48	25	106	119	6	92
Internal Link Dist (ft)	124		262			46			196
Turn Bay Length (ft)		82		82			25	95	
Base Capacity (vph)	956	914	962	901	914	1828	857	632	1222
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.24	0.01	0.22	0.02	0.17	0.28	0.00	0.22

Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: San Lorenzo Dr/Broadway St & San Antonio Dr

TAMC Regional ICE - King City
 Existing PM (2015)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↑	↗	↖	↑↑	↗	↖	↕↕	
Volume (veh/h)	1	7	8	200	5	184	19	288	220	2	181	71
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.95
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	1	8	9	217	5	200	21	313	239	2	197	77
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	5	39	44	373	392	330	473	943	414	282	394	147
Arrive On Green	0.05	0.05	0.05	0.21	0.21	0.21	0.27	0.27	0.27	0.16	0.16	0.16
Sat Flow, veh/h	94	751	845	1774	1863	1568	1774	3539	1554	1774	2481	927
Grp Volume(v), veh/h	18	0	0	217	5	200	21	313	239	2	138	136
Grp Sat Flow(s),veh/h/ln	1691	0	0	1774	1863	1568	1774	1770	1554	1774	1770	1638
Q Serve(g_s), s	0.5	0.0	0.0	5.6	0.1	5.9	0.5	3.6	6.8	0.0	3.6	3.9
Cycle Q Clear(g_c), s	0.5	0.0	0.0	5.6	0.1	5.9	0.5	3.6	6.8	0.0	3.6	3.9
Prop In Lane	0.06		0.50	1.00		1.00	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	88	0	0	373	392	330	473	943	414	282	281	260
V/C Ratio(X)	0.20	0.00	0.00	0.58	0.01	0.61	0.04	0.33	0.58	0.01	0.49	0.52
Avail Cap(c_a), veh/h	924	0	0	900	945	796	900	1796	788	623	622	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.3	0.0	0.0	18.2	16.0	18.3	14.0	15.1	16.3	18.1	19.7	19.8
Incr Delay (d2), s/veh	0.4	0.0	0.0	2.0	0.0	2.6	0.1	0.3	1.8	0.0	1.9	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.3	0.0	0.0	3.0	0.1	2.8	0.2	1.8	3.1	0.0	1.9	1.9
LnGrp Delay(d),s/veh	23.7	0.0	0.0	20.3	16.0	20.9	14.0	15.4	18.1	18.2	21.5	22.1
LnGrp LOS	C			C	B	C	B	B	B	B	C	C
Approach Vol, veh/h		18			422			573			276	
Approach Delay, s/veh		23.7			20.5			16.5			21.8	
Approach LOS		C			C			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.1		6.7		17.6		14.8				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		18.0		28.0		26.0		26.0				
Max Q Clear Time (g_c+I1), s		5.9		2.5		8.8		7.9				
Green Ext Time (p_c), s		1.6		0.0		3.9		2.0				
Intersection Summary												
HCM 2010 Ctrl Delay				19.0								
HCM 2010 LOS				B								

Intersection												
Int Delay, s/veh	2.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	0	38	1	63	68	464	0	0	202	187
Future Vol, veh/h	0	0	0	38	1	63	68	464	0	0	202	187
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
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	0	0	0	41	1	68	74	504	0	0	220	203












Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	872	872	504	220	0	0	504	0	0
Stage 1	652	652	-	-	-	-	-	-	-
Stage 2	220	220	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	321	289	568	1349	-	-	1061	-	-
Stage 1	518	464	-	-	-	-	-	-	-
Stage 2	817	721	-	-	-	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	297	0	568	1349	-	-	1061	-	-
Mov Cap-2 Maneuver	297	0	-	-	-	-	-	-	-
Stage 1	479	0	-	-	-	-	-	-	-
Stage 2	817	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1349	-	-	423	1061	-	-
HCM Lane V/C Ratio	0.055	-	-	0.262	-	-	-
HCM Control Delay (s)	7.8	0	-	16.5	0	-	-
HCM Lane LOS	A	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	1	0	-	-

Queues

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St




















											
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	14	142	3	97	75	201	263	5	372	26	30
v/c Ratio	0.08	0.24	0.01	0.27	0.14	0.19	0.58	0.01	0.49	0.13	0.18
Control Delay	39.2	31.8	33.7	8.9	21.4	20.5	28.4	27.0	27.7	38.6	39.5
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	39.2	31.8	33.7	8.9	21.4	20.5	28.4	27.0	27.7	38.6	39.5
Queue Length 50th (ft)	5	26	1	0	23	32	91	2	69	10	11
Queue Length 95th (ft)	29	72	10	39	69	77	222	12	158	43	49
Internal Link Dist (ft)	408		329			237			233	361	
Turn Bay Length (ft)		150		82	200		200	95			
Base Capacity (vph)	440	1455	789	724	1125	2249	981	634	1176	201	172
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	0.03	0.10	0.00	0.13	0.07	0.09	0.27	0.01	0.32	0.13	0.17
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

TAMC Regional ICE - King City

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

Proposed AM (2015)

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	1	5	1	6	30	100	3	89	63	6	185	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00				0.97	1.00	1.00		1.00	0.95	1.00
Frbp, ped/bikes		0.99				1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Frt		0.92				1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1691				3433	1863	1563		1770	3539	1547
Flt Permitted		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1691				3433	1863	1563		1770	3539	1547
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	5	1	7	33	109	3	97	68	7	201	263
RTOR Reduction (vph)	0	0	0	0	0	0	0	81	0	0	0	0
Lane Group Flow (vph)	0	14	0	0	0	142	3	16	0	75	201	263
Confl. Peds. (#/hr)	1		1	1	1	1		1		4		2
Confl. Bikes (#/hr)												
Turn Type	Split	NA			Split	Split	NA	Perm	Split	Split	NA	Perm
Protected Phases	4	4			8	8	8		2	2	2	
Permitted Phases								8				2
Actuated Green, G (s)		0.9				11.6	11.6	11.6		19.8	19.8	19.8
Effective Green, g (s)		0.9				11.6	11.6	11.6		19.8	19.8	19.8
Actuated g/C Ratio		0.01				0.16	0.16	0.16		0.28	0.28	0.28
Clearance Time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		2.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		21				556	301	253		489	978	427
v/s Ratio Prot		c0.01				c0.04	0.00			0.04	0.06	
v/s Ratio Perm								0.01				c0.17
v/c Ratio		0.67				0.26	0.01	0.06		0.15	0.21	0.62
Uniform Delay, d1		35.2				26.2	25.2	25.4		19.6	19.9	22.6
Progression Factor		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		47.8				0.3	0.0	0.1		0.2	0.1	3.0
Delay (s)		83.0				26.6	25.2	25.5		19.8	20.0	25.6
Level of Service		F				C	C	C		B	C	C
Approach Delay (s)		83.0					26.1				22.7	
Approach LOS		F					C				C	
Intersection Summary												
HCM 2000 Control Delay			25.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			71.6			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			47.0%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis












1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St



Movement	SBL2	SBL	SBT	SBR	SBR2	NWL2	NWL	NWR	NWR2
Lane Configurations									
Volume (vph)	5	0	212	38	93	23	1	7	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0	
Lane Util. Factor		1.00	0.95				1.00	1.00	
Frbp, ped/bikes		1.00	0.99				1.00	0.95	
Flpb, ped/bikes		1.00	1.00				1.00	1.00	
Frt		1.00	0.94				1.00	0.85	
Flt Protected		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1770	3293				1770	1505	
Flt Permitted		0.95	1.00				0.95	1.00	
Satd. Flow (perm)		1770	3293				1770	1505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	230	41	101	25	1	8	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	372	0	0	0	26	30	0
Confl. Peds. (#/hr)	2			4	4			1	2
Confl. Bikes (#/hr)					1				
Turn Type	Split	Split	NA			Prot	Prot	Perm	
Protected Phases	6	6	6			9	9		
Permitted Phases								9	
Actuated Green, G (s)		15.7	15.7				3.6	3.6	
Effective Green, g (s)		15.7	15.7				3.6	3.6	
Actuated g/C Ratio		0.22	0.22				0.05	0.05	
Clearance Time (s)		4.0	4.0				4.0	4.0	
Vehicle Extension (s)		4.0	4.0				4.0	4.0	
Lane Grp Cap (vph)		388	722				88	75	
v/s Ratio Prot		0.00	c0.11				0.01		
v/s Ratio Perm								c0.02	
v/c Ratio		0.01	0.52				0.30	0.40	
Uniform Delay, d1		21.9	24.6				32.8	33.0	
Progression Factor		1.00	1.00				1.00	1.00	
Incremental Delay, d2		0.0	0.8				2.6	4.7	
Delay (s)		21.9	25.4				35.3	37.7	
Level of Service		C	C				D	D	
Approach Delay (s)			25.4				36.6		
Approach LOS			C				D		
Intersection Summary									

Queues

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

											
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	18	218	5	200	94	259	226	2	274	43	67
v/c Ratio	0.11	0.37	0.02	0.46	0.21	0.29	0.58	0.01	0.45	0.23	0.42
Control Delay	39.9	31.2	31.6	9.4	24.4	23.5	31.4	30.0	30.9	40.0	46.0
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	39.9	31.2	31.6	9.4	24.4	23.5	31.4	30.0	30.9	40.0	46.0
Queue Length 50th (ft)	7	38	2	0	28	41	74	1	48	15	24
Queue Length 95th (ft)	34	100	13	61	85	99	194	7	121	62	#106
Internal Link Dist (ft)	408		329			237			233	361	
Turn Bay Length (ft)		150		82	200		200	95			
Base Capacity (vph)	404	1326	719	724	1025	2051	897	578	1066	184	159
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	0.04	0.16	0.01	0.28	0.09	0.13	0.25	0.00	0.26	0.23	0.42

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

TAMC Regional ICE - King City

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

Proposed PM (2015)

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	1	7	1	7	64	136	5	184	68	18	238	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00				0.97	1.00	1.00		1.00	0.95	1.00
Frbp, ped/bikes		0.99				1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Frt		0.93				1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1712				3433	1863	1560		1770	3539	1549
Flt Permitted		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1712				3433	1863	1560		1770	3539	1549
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	8	1	8	70	148	5	200	74	20	259	226
RTOR Reduction (vph)	0	0	0	0	0	0	0	166	0	0	0	0
Lane Group Flow (vph)	0	18	0	0	0	218	5	34	0	94	259	226
Confl. Peds. (#/hr)	3		7	7	7	7		3		10		1
Confl. Bikes (#/hr)												
Turn Type	Split	NA			Split	Split	NA	Perm	Split	Split	NA	Perm
Protected Phases	4	4			8	8	8		2	2	2	
Permitted Phases								8				2
Actuated Green, G (s)		2.1				12.3	12.3	12.3		18.0	18.0	18.0
Effective Green, g (s)		2.1				12.3	12.3	12.3		18.0	18.0	18.0
Actuated g/C Ratio		0.03				0.17	0.17	0.17		0.25	0.25	0.25
Clearance Time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		2.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		49				578	313	262		436	872	381
v/s Ratio Prot		c0.01				c0.06	0.00			0.05	0.07	
v/s Ratio Perm								0.02				c0.15
v/c Ratio		0.37				0.38	0.02	0.13		0.22	0.30	0.59
Uniform Delay, d1		34.8				26.9	25.3	25.8		21.9	22.4	24.3
Progression Factor		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.7				0.6	0.0	0.3		0.3	0.3	2.9
Delay (s)		36.5				27.5	25.3	26.1		22.2	22.6	27.2
Level of Service		D				C	C	C		C	C	C
Approach Delay (s)		36.5					26.8				24.3	
Approach LOS		D					C				C	
Intersection Summary												
HCM 2000 Control Delay			26.5								HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			73.0								Sum of lost time (s)	20.0
Intersection Capacity Utilization			47.1%								ICU Level of Service	A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

TAMC Regional ICE - King City
 Proposed PM (2015)



Movement	SBL2	SBL	SBT	SBR	SBR2	NWL2	NWL	NWR	NWR2
Lane Configurations									
Volume (vph)	2	0	137	44	71	39	1	50	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0	
Lane Util. Factor		1.00	0.95				1.00	1.00	
Frbp, ped/bikes		1.00	0.99				1.00	0.98	
Flpb, ped/bikes		1.00	1.00				1.00	1.00	
Frt		1.00	0.93				1.00	0.85	
Flt Protected		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1770	3261				1770	1544	
Flt Permitted		0.95	1.00				0.95	1.00	
Satd. Flow (perm)		1770	3261				1770	1544	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	149	48	77	42	1	54	13
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2	274	0	0	0	43	67	0
Confl. Peds. (#/hr)	1				1				1
Confl. Bikes (#/hr)					1				
Turn Type	Split	Split	NA			Prot	Prot	Perm	
Protected Phases	6	6	6			9	9		
Permitted Phases								9	
Actuated Green, G (s)		13.2	13.2				7.4	7.4	
Effective Green, g (s)		13.2	13.2				7.4	7.4	
Actuated g/C Ratio		0.18	0.18				0.10	0.10	
Clearance Time (s)		4.0	4.0				4.0	4.0	
Vehicle Extension (s)		4.0	4.0				4.0	4.0	
Lane Grp Cap (vph)		320	589				179	156	
v/s Ratio Prot		0.00	c0.08				0.02		
v/s Ratio Perm								c0.04	
v/c Ratio		0.01	0.47				0.24	0.43	
Uniform Delay, d1		24.5	26.7				30.2	30.8	
Progression Factor		1.00	1.00				1.00	1.00	
Incremental Delay, d2		0.0	0.8				1.0	2.6	
Delay (s)		24.5	27.5				31.2	33.4	
Level of Service		C	C				C	C	
Approach Delay (s)			27.5				32.5		
Approach LOS			C				C		
Intersection Summary									

Queues

1: Broadway St & San Antonio Dr



Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	20	202	4	138	10	287	375	8	533
v/c Ratio	0.11	0.51	0.01	0.30	0.02	0.32	0.69	0.02	0.57
Control Delay	26.7	29.9	24.5	7.4	21.6	22.0	18.5	24.6	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	29.9	24.5	7.4	21.6	22.0	18.5	24.6	24.3
Queue Length 50th (ft)	3	64	1	0	3	44	53	2	73
Queue Length 95th (ft)	27	164	10	44	16	98	176	15	192
Internal Link Dist (ft)	124		262			46			196
Turn Bay Length (ft)				82			25	95	
Base Capacity (vph)	796	760	800	749	760	1520	778	555	1082
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.27	0.01	0.18	0.01	0.19	0.48	0.01	0.49

Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Broadway St & San Antonio Dr

TAMC Regional ICE - King City
 Future AM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↖	↗	↗	↖	↖	↗	↖	↕
Traffic Volume (veh/h)	1	7	10	186	4	127	9	264	345	7	357	133
Future Volume (veh/h)	1	7	10	186	4	127	9	264	345	7	357	133
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.99	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	1	8	11	202	4	138	10	287	375	8	388	145
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	22	30	298	313	265	551	1100	489	399	565	208
Arrive On Green	0.03	0.03	0.03	0.17	0.17	0.17	0.31	0.31	0.31	0.23	0.23	0.23
Sat Flow, veh/h	85	676	930	1774	1863	1581	1774	3539	1573	1774	2511	924
Grp Volume(v), veh/h	20	0	0	202	4	138	10	287	375	8	272	261
Grp Sat Flow(s),veh/h/ln	1691	0	0	1774	1863	1581	1774	1770	1573	1774	1770	1666
Q Serve(g_s), s	0.7	0.0	0.0	6.5	0.1	4.8	0.2	3.7	13.1	0.2	8.5	8.7
Cycle Q Clear(g_c), s	0.7	0.0	0.0	6.5	0.1	4.8	0.2	3.7	13.1	0.2	8.5	8.7
Prop In Lane	0.05		0.55	1.00		1.00	1.00		1.00	1.00		0.55
Lane Grp Cap(c), veh/h	54	0	0	298	313	265	551	1100	489	399	398	375
V/C Ratio(X)	0.37	0.00	0.00	0.68	0.01	0.52	0.02	0.26	0.77	0.02	0.68	0.70
Avail Cap(c_a), veh/h	782	0	0	762	800	679	762	1520	676	557	555	523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	0.0	0.0	23.7	21.0	23.0	14.5	15.6	18.9	18.3	21.5	21.6
Incr Delay (d2), s/veh	1.6	0.0	0.0	3.8	0.0	2.2	0.0	0.2	4.5	0.0	2.9	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.5	0.1	2.3	0.1	1.8	6.2	0.1	4.5	4.3
LnGrp Delay(d),s/veh	30.3	0.0	0.0	27.5	21.0	25.2	14.5	15.8	23.3	18.3	24.4	24.9
LnGrp LOS	C			C	C	C	B	B	C	B	C	C
Approach Vol, veh/h		20			344			672			541	
Approach Delay, s/veh		30.3			26.5			20.0			24.5	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		17.6		5.9		22.8		14.2				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		19.0		28.0		26.0		26.0				
Max Q Clear Time (g_c+I1), s		10.7		2.7		15.1		8.5				
Green Ext Time (p_c), s		2.7		0.0		3.5		1.6				
Intersection Summary												
HCM 2010 Ctrl Delay				23.1								
HCM 2010 LOS				C								

Intersection

Int Delay, s/veh 1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	0	31	2	39	90	579	0	0	355	198
Future Vol, veh/h	0	0	0	31	2	39	90	579	0	0	355	198
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
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	0	0	0	34	2	42	98	629	0	0	386	215

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1211	1211	629	386	0	0	629	0	0
Stage 1	825	825	-	-	-	-	-	-	-
Stage 2	386	386	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	201	182	482	1172	-	-	953	-	-
Stage 1	430	387	-	-	-	-	-	-	-
Stage 2	687	610	-	-	-	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	175	0	482	1172	-	-	953	-	-
Mov Cap-2 Maneuver	175	0	-	-	-	-	-	-	-
Stage 1	375	0	-	-	-	-	-	-	-
Stage 2	687	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.6	1.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1	SBL	SBT	SBR
Capacity (veh/h)	1172	-	- 271	953	-	-
HCM Lane V/C Ratio	0.083	-	- 0.289	-	-	-
HCM Control Delay (s)	8.4	0	- 23.6	0	-	-
HCM Lane LOS	A	A	- C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	- 1.2	0	-	-

Queues

1: Broadway St & San Antonio Dr






















Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	24	310	8	286	28	370	323	3	323
v/c Ratio	0.13	0.59	0.01	0.43	0.06	0.40	0.64	0.01	0.47
Control Delay	27.9	27.9	21.7	5.7	22.7	23.3	20.8	29.0	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	27.9	21.7	5.7	22.7	23.3	20.8	29.0	23.5
Queue Length 50th (ft)	4	88	2	0	7	55	55	1	41
Queue Length 95th (ft)	32	248	14	59	33	132	185	9	111
Internal Link Dist (ft)	124		262			46			196
Turn Bay Length (ft)				82			25	95	
Base Capacity (vph)	809	769	810	839	769	1539	749	562	1095
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.40	0.01	0.34	0.04	0.24	0.43	0.01	0.29

Intersection Summary

HCM 2010 Signalized Intersection Summary
1: Broadway St & San Antonio Dr

TAMC Regional ICE - King City
Future PM (2030)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	10	11	285	7	263	26	340	297	3	196	101
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.95
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	1	11	12	310	8	286	28	370	323	3	213	110
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	44	48	442	464	391	512	1021	449	288	366	179
Arrive On Green	0.06	0.06	0.06	0.25	0.25	0.25	0.29	0.29	0.29	0.16	0.16	0.16
Sat Flow, veh/h	70	773	843	1774	1863	1570	1774	3539	1556	1774	2258	1107
Grp Volume(v), veh/h	24	0	0	310	8	286	28	370	323	3	165	158
Grp Sat Flow(s),veh/h/ln	1687	0	0	1774	1863	1570	1774	1770	1556	1774	1770	1595
Q Serve(g_s), s	0.9	0.0	0.0	10.5	0.2	11.0	0.8	5.5	12.3	0.1	5.7	6.1
Cycle Q Clear(g_c), s	0.9	0.0	0.0	10.5	0.2	11.0	0.8	5.5	12.3	0.1	5.7	6.1
Prop In Lane	0.04		0.50	1.00		1.00	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	97	0	0	442	464	391	512	1021	449	288	287	259
V/C Ratio(X)	0.25	0.00	0.00	0.70	0.02	0.73	0.05	0.36	0.72	0.01	0.57	0.61
Avail Cap(c_a), veh/h	718	0	0	701	736	620	701	1399	615	512	511	461
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(l)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.7	0.0	0.0	22.5	18.6	22.7	16.9	18.6	21.0	23.1	25.5	25.6
Incr Delay (d2), s/veh	0.5	0.0	0.0	2.9	0.0	3.8	0.1	0.3	3.4	0.0	2.6	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.4	0.0	0.0	5.4	0.1	5.2	0.4	2.7	5.6	0.0	2.9	2.9
LnGrp Delay(d),s/veh	30.2	0.0	0.0	25.4	18.7	26.4	17.0	18.9	24.4	23.2	28.0	29.0
LnGrp LOS	C			C	B	C	B	B	C	C	C	C
Approach Vol, veh/h		24			604			721			326	
Approach Delay, s/veh		30.2			25.8			21.3			28.4	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.7		7.8		23.0		20.4				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		19.0		28.0		26.0		26.0				
Max Q Clear Time (g_c+I1), s		8.1		2.9		14.3		13.0				
Green Ext Time (p_c), s		1.9		0.0		4.0		2.7				
Intersection Summary												
HCM 2010 Ctrl Delay				24.4								
HCM 2010 LOS				C								

Intersection

Int Delay, s/veh 3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	0	54	2	88	97	575	0	0	234	258
Future Vol, veh/h	0	0	0	54	2	88	97	575	0	0	234	258
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
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	0	0	0	59	2	96	105	625	0	0	254	280

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1090	1090	625	254	0	0	625	0	0
Stage 1	836	836	-	-	-	-	-	-	-
Stage 2	254	254	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	238	215	485	1311	-	-	956	-	-
Stage 1	425	382	-	-	-	-	-	-	-
Stage 2	788	697	-	-	-	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	209	0	485	1311	-	-	956	-	-
Mov Cap-2 Maneuver	209	0	-	-	-	-	-	-	-
Stage 1	373	0	-	-	-	-	-	-	-
Stage 2	788	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.2	1.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1	SBL	SBT	SBR
Capacity (veh/h)	1311	-	- 323	956	-	-
HCM Lane V/C Ratio	0.08	-	- 0.485	-	-	-
HCM Control Delay (s)	8	0	- 26.2	0	-	-
HCM Lane LOS	A	A	- D	A	-	-
HCM 95th %tile Q(veh)	0.3	-	- 2.5	0	-	-

Queues

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St



Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	20	202	4	138	108	287	375	8	533	35	43
v/c Ratio	0.15	0.40	0.01	0.40	0.18	0.24	0.73	0.02	0.65	0.32	0.46
Control Delay	48.9	40.8	40.2	11.5	24.3	23.2	36.8	31.9	36.2	55.5	64.2
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	48.9	40.8	40.2	11.5	24.3	23.2	36.8	31.9	36.2	55.5	64.2
Queue Length 50th (ft)	10	51	2	0	40	57	173	3	129	18	23
Queue Length 95th (ft)	39	106	13	56	97	111	347	18	249	#61	#90
Internal Link Dist (ft)	408		329			359			233	652	
Turn Bay Length (ft)		150		82	200		200	95			
Base Capacity (vph)	340	1114	604	600	839	1679	732	552	1028	110	94
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	0.06	0.18	0.01	0.23	0.13	0.17	0.51	0.01	0.52	0.32	0.46

Intersection Summary




















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

HCM Signalized Intersection Capacity Analysis

TAMC Regional ICE - King City

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

Proposed AM (2030)

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	1	7	1	9	43	143	4	127	90	9	264	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00				0.97	1.00	1.00		1.00	0.95	1.00
Frbp, ped/bikes		0.99				1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Frt		0.93				1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1707				3433	1863	1563		1770	3539	1546
Flt Permitted		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1707				3433	1863	1563		1770	3539	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	8	1	10	47	155	4	138	98	10	287	375
RTOR Reduction (vph)	0	0	0	0	0	0	0	118	0	0	0	0
Lane Group Flow (vph)	0	20	0	0	0	202	4	20	0	108	287	375
Confl. Peds. (#/hr)	1		1	1	1	1		1		4		2
Confl. Bikes (#/hr)												
Turn Type	Split	NA			Split	Split	NA	Perm	Split	Split	NA	Perm
Protected Phases	4	4			8	8	8		2	2	2	
Permitted Phases								8				2
Actuated Green, G (s)		2.2				12.8	12.8	12.8		28.9	28.9	28.9
Effective Green, g (s)		2.2				12.8	12.8	12.8		28.9	28.9	28.9
Actuated g/C Ratio		0.02				0.14	0.14	0.14		0.32	0.32	0.32
Clearance Time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		2.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		42				492	267	224		573	1146	500
v/s Ratio Prot		c0.01				c0.06	0.00			0.06	0.08	
v/s Ratio Perm								0.01				c0.24
v/c Ratio		0.48				0.41	0.01	0.09		0.19	0.25	0.75
Uniform Delay, d1		42.9				34.8	32.8	33.1		21.7	22.2	26.9
Progression Factor		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		3.1				0.8	0.0	0.2		0.2	0.2	6.6
Delay (s)		46.0				35.5	32.8	33.4		21.9	22.3	33.6
Level of Service		D				D	C	C		C	C	C
Approach Delay (s)		46.0					34.6				27.7	
Approach LOS		D					C				C	
Intersection Summary												
HCM 2000 Control Delay			32.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			89.2			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			52.3%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St



Movement	SBL2	SBL	SBT	SBR	SBR2	NWL2	NWL	NWR	NWR2
Lane Configurations									
Volume (vph)	7	0	303	54	133	31	1	10	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0	
Lane Util. Factor		1.00	0.95				1.00	1.00	
Frbp, ped/bikes		1.00	0.99				1.00	0.96	
Flpb, ped/bikes		1.00	1.00				1.00	1.00	
Frt		1.00	0.94				1.00	0.85	
Flt Protected		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1770	3298				1770	1514	
Flt Permitted		0.95	1.00				0.95	1.00	
Satd. Flow (perm)		1770	3298				1770	1514	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	0	329	59	145	34	1	11	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	8	533	0	0	0	35	43	0
Confl. Peds. (#/hr)	2				4				2
Confl. Bikes (#/hr)				1					
Turn Type	Split	Split	NA			Prot	Prot	Perm	
Protected Phases	6	6	6			9	9		
Permitted Phases								9	
Actuated Green, G (s)		21.6	21.6				3.7	3.7	
Effective Green, g (s)		21.6	21.6				3.7	3.7	
Actuated g/C Ratio		0.24	0.24				0.04	0.04	
Clearance Time (s)		4.0	4.0				4.0	4.0	
Vehicle Extension (s)		4.0	4.0				4.0	4.0	
Lane Grp Cap (vph)		428	798				73	62	
v/s Ratio Prot		0.00	c0.16				0.02		
v/s Ratio Perm								c0.03	
v/c Ratio		0.02	0.67				0.48	0.69	
Uniform Delay, d1		25.7	30.6				41.8	42.2	
Progression Factor		1.00	1.00				1.00	1.00	
Incremental Delay, d2		0.0	2.3				6.6	30.5	
Delay (s)		25.8	32.9				48.4	72.7	
Level of Service		C	C				D	E	
Approach Delay (s)			32.8				61.8		
Approach LOS			C				E		
Intersection Summary									

Queues

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St



Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	24	310	8	286	133	370	323	3	391	60	95
v/c Ratio	0.19	0.53	0.03	0.57	0.26	0.37	0.73	0.01	0.64	0.30	0.54
Control Delay	53.8	42.2	39.3	9.9	30.4	29.7	43.5	38.3	43.5	50.4	59.1
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	53.8	42.2	39.3	9.9	30.4	29.7	43.5	38.3	43.5	50.4	59.1
Queue Length 50th (ft)	15	97	5	0	67	101	191	2	127	37	61
Queue Length 95th (ft)	46	155	20	76	131	162	330	11	203	89	#150
Internal Link Dist (ft)	408		329			368			233	361	
Turn Bay Length (ft)		150		82	200		200	95			
Base Capacity (vph)	305	999	542	655	693	1386	606	436	793	218	190
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	0.08	0.31	0.01	0.44	0.19	0.27	0.53	0.01	0.49	0.28	0.50

Intersection Summary




















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

HCM Signalized Intersection Capacity Analysis

TAMC Regional ICE - King City

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

Proposed PM (2030)

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	1	10	1	10	91	194	7	263	97	26	340	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00				0.97	1.00	1.00		1.00	0.95	1.00
Frbp, ped/bikes		0.99				1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Frt		0.93				1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1710				3433	1863	1559		1770	3539	1549
Flt Permitted		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1710				3433	1863	1559		1770	3539	1549
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	11	1	11	99	211	8	286	105	28	370	323
RTOR Reduction (vph)	0	0	0	0	0	0	0	238	0	0	0	0
Lane Group Flow (vph)	0	24	0	0	0	310	8	48	0	133	370	323
Confl. Peds. (#/hr)	3		7	7	7	7		3		10		1
Confl. Bikes (#/hr)												
Turn Type	Split	NA			Split	Split	NA	Perm	Split	Split	NA	Perm
Protected Phases	4	4			8	8	8		2	2	2	
Permitted Phases								8				2
Actuated Green, G (s)		3.6				16.2	16.2	16.2		27.2	27.2	27.2
Effective Green, g (s)		3.6				16.2	16.2	16.2		27.2	27.2	27.2
Actuated g/C Ratio		0.04				0.17	0.17	0.17		0.28	0.28	0.28
Clearance Time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		2.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		64				579	314	263		501	1002	438
v/s Ratio Prot		c0.01				c0.09	0.00			0.08	0.10	
v/s Ratio Perm								0.03				c0.21
v/c Ratio		0.38				0.54	0.03	0.18		0.27	0.37	0.74
Uniform Delay, d1		45.1				36.5	33.3	34.2		26.7	27.5	31.2
Progression Factor		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.3				1.2	0.0	0.5		0.4	0.3	6.8
Delay (s)		46.4				37.7	33.4	34.7		27.0	27.8	38.0
Level of Service		D				D	C	C		C	C	D
Approach Delay (s)		46.4					36.2				31.7	
Approach LOS		D					D				C	
Intersection Summary												
HCM 2000 Control Delay			35.4			HCM 2000 Level of Service					D	
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			54.1%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St



Movement	SBL2	SBL	SBT	SBR	SBR2	NWL2	NWL	NWR	NWR2
Lane Configurations									
Volume (vph)	3	0	196	63	101	54	1	71	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0	
Lane Util. Factor		1.00	0.95				1.00	1.00	
Frbp, ped/bikes		1.00	0.98				1.00	0.98	
Flpb, ped/bikes		1.00	1.00				1.00	1.00	
Frt		1.00	0.93				1.00	0.85	
Flt Protected		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1770	3233				1770	1545	
Flt Permitted		0.95	1.00				0.95	1.00	
Satd. Flow (perm)		1770	3233				1770	1545	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	0	213	68	110	59	1	77	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	3	391	0	0	0	60	95	0
Confl. Peds. (#/hr)	1				10				1
Confl. Bikes (#/hr)					1				
Turn Type	Split	Split	NA			Prot	Prot	Perm	
Protected Phases	6	6	6			9	9		
Permitted Phases								9	
Actuated Green, G (s)		18.1	18.1				10.9	10.9	
Effective Green, g (s)		18.1	18.1				10.9	10.9	
Actuated g/C Ratio		0.19	0.19				0.11	0.11	
Clearance Time (s)		4.0	4.0				4.0	4.0	
Vehicle Extension (s)		4.0	4.0				4.0	4.0	
Lane Grp Cap (vph)		333	609				200	175	
v/s Ratio Prot		0.00	c0.12				0.03		
v/s Ratio Perm								c0.06	
v/c Ratio		0.01	0.64				0.30	0.54	
Uniform Delay, d1		31.7	36.0				39.0	40.2	
Progression Factor		1.00	1.00				1.00	1.00	
Incremental Delay, d2		0.0	2.6				1.2	4.3	
Delay (s)		31.7	38.5				40.2	44.5	
Level of Service		C	D				D	D	
Approach Delay (s)			38.5				42.8		
Approach LOS			D				D		

Intersection Summary

Queues
1: Broadway St & San Antonio Dr













	→	↖	←	↗	↘	↑	↙	↘	↓
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	26	255	5	175	12	364	476	10	675
v/c Ratio	0.17	0.64	0.01	0.36	0.02	0.33	0.77	0.02	0.77
Control Delay	28.1	35.8	25.0	6.7	22.6	22.8	24.6	28.0	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	35.8	25.0	6.7	22.6	22.8	24.6	28.0	34.6
Queue Length 50th (ft)	5	105	2	0	3	61	102	3	139
Queue Length 95th (ft)	33	205	11	48	19	132	#334	19	#313
Internal Link Dist (ft)	124		262			46			196
Turn Bay Length (ft)				82			25	95	
Base Capacity (vph)	647	614	646	656	614	1228	667	449	882
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.42	0.01	0.27	0.02	0.30	0.71	0.02	0.77

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Broadway St & San Antonio Dr

TAMC Regional ICE - King City
 Future AM (2040)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↖	↗	↗	↖	↖	↗	↖	↕
Traffic Volume (veh/h)	2	9	13	235	5	161	11	335	438	9	453	168
Future Volume (veh/h)	2	9	13	235	5	161	11	335	438	9	453	168
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.99	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	2	10	14	255	5	175	12	364	476	10	492	183
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	5	24	34	335	352	299	587	1172	521	413	584	216
Arrive On Green	0.04	0.04	0.04	0.19	0.19	0.19	0.33	0.33	0.33	0.23	0.23	0.23
Sat Flow, veh/h	130	651	911	1774	1863	1581	1774	3539	1574	1774	2509	927
Grp Volume(v), veh/h	26	0	0	255	5	175	12	364	476	10	346	329
Grp Sat Flow(s),veh/h/ln	1691	0	0	1774	1863	1581	1774	1770	1574	1774	1770	1666
Q Serve(g_s), s	1.1	0.0	0.0	10.4	0.2	7.7	0.3	5.8	22.1	0.3	14.2	14.4
Cycle Q Clear(g_c), s	1.1	0.0	0.0	10.4	0.2	7.7	0.3	5.8	22.1	0.3	14.2	14.4
Prop In Lane	0.08		0.54	1.00		1.00	1.00		1.00	1.00		0.56
Lane Grp Cap(c), veh/h	62	0	0	335	352	299	587	1172	521	413	412	388
V/C Ratio(X)	0.42	0.00	0.00	0.76	0.01	0.59	0.02	0.31	0.91	0.02	0.84	0.85
Avail Cap(c_a), veh/h	622	0	0	606	636	540	606	1209	538	443	442	416
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.8	0.0	0.0	29.2	25.1	28.2	17.1	19.0	24.4	22.5	27.8	27.9
Incr Delay (d2), s/veh	1.6	0.0	0.0	5.0	0.0	2.6	0.0	0.2	20.2	0.0	13.5	15.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	5.6	0.1	3.6	0.2	2.9	12.4	0.2	8.5	8.2
LnGrp Delay(d),s/veh	37.5	0.0	0.0	34.3	25.1	30.8	17.2	19.2	44.6	22.6	41.3	43.0
LnGrp LOS	D			C	C	C	B	B	D	C	D	D
Approach Vol, veh/h		26			435			852			685	
Approach Delay, s/veh		37.5			32.8			33.4			41.8	
Approach LOS		D			C			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.7		6.8		29.2		18.4				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		19.0		28.0		26.0		26.0				
Max Q Clear Time (g_c+I1), s		16.4		3.1		24.1		12.4				
Green Ext Time (p_c), s		1.3		0.1		1.1		1.9				
Intersection Summary												
HCM 2010 Ctrl Delay				36.2								
HCM 2010 LOS				D								

Intersection

Int Delay, s/veh 3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	0	40	4	49	114	735	0	0	440	261
Future Vol, veh/h	0	0	0	40	4	49	114	735	0	0	440	261
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
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	0	0	0	43	4	53	124	799	0	0	478	284

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1525	1525	799	478	0	0	799	0	0
Stage 1	1047	1047	-	-	-	-	-	-	-
Stage 2	478	478	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	130	118	386	1084	-	-	824	-	-
Stage 1	338	305	-	-	-	-	-	-	-
Stage 2	624	556	-	-	-	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	103	0	386	1084	-	-	824	-	-
Mov Cap-2 Maneuver	103	0	-	-	-	-	-	-	-
Stage 1	268	0	-	-	-	-	-	-	-
Stage 2	624	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	51.5	1.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1	SBL	SBT	SBR
Capacity (veh/h)	1084	-	- 173	824	-	-
HCM Lane V/C Ratio	0.114	-	- 0.584	-	-	-
HCM Control Delay (s)	8.7	0	- 51.5	0	-	-
HCM Lane LOS	A	A	- F	A	-	-
HCM 95th %tile Q(veh)	0.4	-	- 3.1	0	-	-

Queues

1: Broadway St & San Antonio Dr























Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	32	393	10	362	36	468	409	4	496
v/c Ratio	0.22	0.72	0.02	0.50	0.07	0.49	0.79	0.01	0.69
Control Delay	30.3	37.8	25.0	5.7	25.3	28.6	32.1	30.2	35.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	37.8	25.0	5.7	25.3	28.6	32.1	30.2	35.0
Queue Length 50th (ft)	9	214	4	0	16	120	150	2	131
Queue Length 95th (ft)	37	#367	17	66	40	171	#303	11	190
Internal Link Dist (ft)	124		262			46			196
Turn Bay Length (ft)				82			25	95	
Base Capacity (vph)	592	558	588	739	558	1117	581	408	803
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.70	0.02	0.49	0.06	0.42	0.70	0.01	0.62

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 1: Broadway St & San Antonio Dr

TAMC Regional ICE - King City
 Future PM (2040)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	13	15	362	9	333	33	431	376	4	328	128
Future Volume (vph)	2	13	15	362	9	333	33	431	376	4	328	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes		0.99		1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1716		1770	1863	1560	1770	3539	1549	1770	3348	
Flt Permitted		1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1716		1770	1863	1560	1770	3539	1549	1770	3348	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	14	16	393	10	362	36	468	409	4	357	139
RTOR Reduction (vph)	0	15	0	0	0	253	0	0	99	0	34	0
Lane Group Flow (vph)	0	17	0	393	10	109	36	468	310	4	462	0
Confl. Peds. (#/hr)	3		7	7		3	10		1	1		10
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	4	4		8	8		6	6		2	2	
Permitted Phases						8			6			
Actuated Green, G (s)		3.6		25.9	25.9	25.9	23.0	23.0	23.0	17.4	17.4	
Effective Green, g (s)		3.6		25.9	25.9	25.9	23.0	23.0	23.0	17.4	17.4	
Actuated g/C Ratio		0.04		0.30	0.30	0.30	0.27	0.27	0.27	0.20	0.20	
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)		71		533	561	470	473	947	414	358	678	
v/s Ratio Prot		c0.01		c0.22	0.01		0.02	0.13		0.00	c0.14	
v/s Ratio Perm						0.07			c0.20			
v/c Ratio		0.23		0.74	0.02	0.23	0.08	0.49	0.75	0.01	0.68	
Uniform Delay, d1		39.8		26.9	21.1	22.5	23.5	26.5	28.8	27.4	31.7	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.6		5.6	0.0	0.3	0.1	0.6	7.7	0.0	3.1	
Delay (s)		40.4		32.6	21.1	22.9	23.6	27.1	36.5	27.4	34.7	
Level of Service		D		C	C	C	C	C	D	C	C	
Approach Delay (s)		40.4			27.8			31.2			34.7	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.0		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			85.9		Sum of lost time (s)				16.0			
Intersection Capacity Utilization			58.9%		ICU Level of Service				B			
Analysis Period (min)			15									

c Critical Lane Group

Intersection

Int Delay, s/veh 11.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	0	69	2	112	123	728	0	0	366	339
Future Vol, veh/h	0	0	0	69	2	112	123	728	0	0	366	339
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
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	0	0	0	75	2	122	134	791	0	0	398	368












Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1457	1457	791	398	0	0	791	0	0
Stage 1	1059	1059	-	-	-	-	-	-	-
Stage 2	398	398	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	143	130	390	1161	-	-	829	-	-
Stage 1	333	301	-	-	-	-	-	-	-
Stage 2	678	603	-	-	-	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	114	0	390	1161	-	-	829	-	-
Mov Cap-2 Maneuver	114	0	-	-	-	-	-	-	-
Stage 1	264	0	-	-	-	-	-	-	-
Stage 2	678	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	106.7	1.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1	SBL	SBT	SBR
Capacity (veh/h)	1161	-	- 203	829	-	-
HCM Lane V/C Ratio	0.115	-	- 0.98	-	-	-
HCM Control Delay (s)	8.5	0	- 106.7	0	-	-
HCM Lane LOS	A	A	- F	A	-	-
HCM 95th %tile Q(veh)	0.4	-	- 8.4	0	-	-

Queues

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

											
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	26	256	5	175	136	364	476	10	675	45	53
v/c Ratio	0.24	0.55	0.02	0.48	0.21	0.28	0.85	0.02	0.86	0.54	0.74
Control Delay	55.0	47.9	41.0	11.3	26.2	25.8	48.1	34.9	51.4	74.9	102.7
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	55.0	47.9	41.0	11.3	26.2	25.8	48.1	34.9	51.4	74.9	102.7
Queue Length 50th (ft)	18	87	3	0	66	95	308	5	240	31	37
Queue Length 95th (ft)	48	131	15	61	125	147	#550	21	#380	#90	#117
Internal Link Dist (ft)	408		329			359			233	652	
Turn Bay Length (ft)		150		82	200		200	95			
Base Capacity (vph)	261	855	464	520	644	1288	562	424	789	84	72
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	0.10	0.30	0.01	0.34	0.21	0.28	0.85	0.02	0.86	0.54	0.74

Intersection Summary




















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

HCM Signalized Intersection Capacity Analysis

TAMC Regional ICE - King City

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St














Proposed AM (2040)

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	2	9	2	11	54	181	5	161	114	11	335	438
Future Volume (vph)	2	9	2	11	54	181	5	161	114	11	335	438
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00				0.97	1.00	1.00		1.00	0.95	1.00
Frbp, ped/bikes		0.99				1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Frt		0.93				1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1707				3433	1863	1562		1770	3539	1545
Flt Permitted		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1707				3433	1863	1562		1770	3539	1545
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	10	2	12	59	197	5	175	124	12	364	476
RTOR Reduction (vph)	0	0	0	0	0	0	0	152	0	0	0	0
Lane Group Flow (vph)	0	26	0	0	0	256	5	23	0	136	364	476
Confl. Peds. (#/hr)	1		1	1	1	1		1		4		2
Confl. Bikes (#/hr)												
Turn Type	Split	NA			Split	Split	NA	Perm	Split	Split	NA	Perm
Protected Phases	4	4			8	8	8		2	2	2	
Permitted Phases								8				2
Actuated Green, G (s)		4.1				14.2	14.2	14.2		38.2	38.2	38.2
Effective Green, g (s)		4.1				14.2	14.2	14.2		38.2	38.2	38.2
Actuated g/C Ratio		0.04				0.13	0.13	0.13		0.36	0.36	0.36
Clearance Time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		2.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		65				456	247	207		633	1267	553
v/s Ratio Prot		c0.02				c0.07	0.00			0.08	0.10	
v/s Ratio Perm								0.01				c0.31
v/c Ratio		0.40				0.56	0.02	0.11		0.21	0.29	0.86
Uniform Delay, d1		50.1				43.3	40.2	40.7		23.8	24.5	31.8
Progression Factor		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.5				1.9	0.0	0.3		0.2	0.2	13.3
Delay (s)		51.6				45.3	40.2	41.0		24.1	24.7	45.1
Level of Service		D				D	D	D		C	C	D
Approach Delay (s)		51.6					43.5				34.6	
Approach LOS		D					D				C	
Intersection Summary												
HCM 2000 Control Delay			42.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			106.7			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			57.0%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group












HCM Signalized Intersection Capacity Analysis

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

									
Movement	SBL2	SBL	SBT	SBR	SBR2	NWL2	NWL	NWR	NWR2
Lane Configurations									
Traffic Volume (vph)	9	0	384	69	168	40	2	13	36
Future Volume (vph)	9	0	384	69	168	40	2	13	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0	
Lane Util. Factor		1.00	0.95				1.00	1.00	
Frbp, ped/bikes		1.00	0.99				1.00	0.96	
Flpb, ped/bikes		1.00	1.00				1.00	1.00	
Frt		1.00	0.94				1.00	0.85	
Flt Protected		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1770	3297				1770	1519	
Flt Permitted		0.95	1.00				0.95	1.00	
Satd. Flow (perm)		1770	3297				1770	1519	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	0	417	75	183	43	2	14	39
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	10	675	0	0	0	45	53	0
Confl. Peds. (#/hr)	2				4				2
Confl. Bikes (#/hr)				1					
Turn Type	Split	Split	NA			Prot	Prot	Perm	
Protected Phases	6	6	6			9	9		
Permitted Phases								9	
Actuated Green, G (s)		25.2	25.2				5.0	5.0	
Effective Green, g (s)		25.2	25.2				5.0	5.0	
Actuated g/C Ratio		0.24	0.24				0.05	0.05	
Clearance Time (s)		4.0	4.0				4.0	4.0	
Vehicle Extension (s)		4.0	4.0				4.0	4.0	
Lane Grp Cap (vph)		418	778				82	71	
v/s Ratio Prot		0.01	c0.20				0.03		
v/s Ratio Perm								c0.03	
v/c Ratio		0.02	0.87				0.55	0.75	
Uniform Delay, d1		31.3	39.1				49.7	50.2	
Progression Factor		1.00	1.00				1.00	1.00	
Incremental Delay, d2		0.0	10.4				9.1	36.1	
Delay (s)		31.3	49.5				58.8	86.3	
Level of Service		C	D				E	F	
Approach Delay (s)			49.3				73.7		
Approach LOS			D				E		
Intersection Summary									

Queues

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

											
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	32	393	10	362	170	468	409	4	496	77	122
v/c Ratio	0.29	0.64	0.03	0.63	0.30	0.42	0.83	0.01	0.80	0.43	0.78
Control Delay	59.6	47.5	39.2	9.6	32.7	32.6	52.9	40.8	54.2	58.4	83.1
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	59.6	47.5	39.2	9.6	32.7	32.6	52.9	40.8	54.2	58.4	83.1
Queue Length 50th (ft)	23	140	6	0	96	145	284	2	185	55	90
Queue Length 95th (ft)	58	196	22	85	172	215	#515	13	#294	112	#214
Internal Link Dist (ft)	408		329			368			233	361	
Turn Bay Length (ft)		150		82	200		200	95			
Base Capacity (vph)	251	824	447	648	571	1143	500	359	654	179	156
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	0.13	0.48	0.02	0.56	0.30	0.41	0.82	0.01	0.76	0.43	0.78

Intersection Summary




















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

HCM Signalized Intersection Capacity Analysis

TAMC Regional ICE - King City

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St














Proposed PM (2040)

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	2	13	2	13	116	246	9	333	123	33	431	376
Future Volume (vph)	2	13	2	13	116	246	9	333	123	33	431	376
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00				0.97	1.00	1.00		1.00	0.95	1.00
Frbp, ped/bikes		0.99				1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Frt		0.93				1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1706				3433	1863	1558		1770	3539	1548
Flt Permitted		1.00				0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1706				3433	1863	1558		1770	3539	1548
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	14	2	14	126	267	10	362	134	36	468	409
RTOR Reduction (vph)	0	0	0	0	0	0	0	298	0	0	0	0
Lane Group Flow (vph)	0	32	0	0	0	393	10	64	0	170	468	409
Confl. Peds. (#/hr)	3		7	7	7	7		3		10		1
Confl. Bikes (#/hr)												
Turn Type	Split	NA			Split	Split	NA	Perm	Split	Split	NA	Perm
Protected Phases	4	4			8	8	8		2	2	2	
Permitted Phases								8				2
Actuated Green, G (s)		4.4				19.7	19.7	19.7		34.9	34.9	34.9
Effective Green, g (s)		4.4				19.7	19.7	19.7		34.9	34.9	34.9
Actuated g/C Ratio		0.04				0.18	0.18	0.18		0.31	0.31	0.31
Clearance Time (s)		4.0				4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		2.0				4.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		67				607	329	275		555	1109	485
v/s Ratio Prot		c0.02				c0.11	0.01			0.10	0.13	
v/s Ratio Perm								0.04				c0.26
v/c Ratio		0.48				0.65	0.03	0.23		0.31	0.42	0.84
Uniform Delay, d1		52.3				42.6	37.9	39.3		29.0	30.2	35.6
Progression Factor		1.00				1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.9				2.7	0.1	0.6		0.4	0.4	13.1
Delay (s)		54.3				45.2	37.9	39.9		29.4	30.6	48.7
Level of Service		D				D	D	D		C	C	D
Approach Delay (s)		54.3					42.6				37.5	
Approach LOS		D					D				D	
Intersection Summary												
HCM 2000 Control Delay			44.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			111.3			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			62.0%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: San Antonio Dr & 101 NB off ramp & San Lorenzo Dr/Broadway St

									
Movement	SBL2	SBL	SBT	SBR	SBR2	NWL2	NWL	NWR	NWR2
Lane Configurations									
Traffic Volume (vph)	4	0	248	80	128	69	2	90	22
Future Volume (vph)	4	0	248	80	128	69	2	90	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0	
Lane Util. Factor		1.00	0.95				1.00	1.00	
Frbp, ped/bikes		1.00	0.98				1.00	0.98	
Flpb, ped/bikes		1.00	1.00				1.00	1.00	
Frt		1.00	0.93				1.00	0.85	
Flt Protected		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1770	3227				1770	1544	
Flt Permitted		0.95	1.00				0.95	1.00	
Satd. Flow (perm)		1770	3227				1770	1544	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	0	270	87	139	75	2	98	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	4	496	0	0	0	77	122	0
Confl. Peds. (#/hr)	1				10				1
Confl. Bikes (#/hr)					1				
Turn Type	Split	Split	NA			Prot	Prot	Perm	
Protected Phases	6	6	6			9	9		
Permitted Phases								9	
Actuated Green, G (s)		21.2	21.2				11.1	11.1	
Effective Green, g (s)		21.2	21.2				11.1	11.1	
Actuated g/C Ratio		0.19	0.19				0.10	0.10	
Clearance Time (s)		4.0	4.0				4.0	4.0	
Vehicle Extension (s)		4.0	4.0				4.0	4.0	
Lane Grp Cap (vph)		337	614				176	153	
v/s Ratio Prot		0.00	c0.15				0.04		
v/s Ratio Perm								c0.08	
v/c Ratio		0.01	0.81				0.44	0.80	
Uniform Delay, d1		36.6	43.1				47.2	49.0	
Progression Factor		1.00	1.00				1.00	1.00	
Incremental Delay, d2		0.0	8.1				2.4	25.5	
Delay (s)		36.6	51.2				49.5	74.5	
Level of Service		D	D				D	E	
Approach Delay (s)			51.1				64.9		
Approach LOS			D				E		
Intersection Summary									

**BROADWAY STREET AT SAN ANTONIO DRIVE / US 101 NORTHBOUND
RAMP TERMINALS**

Sidra Outputs

LANE SUMMARY

Site: 2015 Proposed AM - Final

Broadway St, San Antonio Dr at US-101 Ramps Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Broadway St													
Lane 1 ^d	539	2.0	1394	0.387	100	6.1	LOS A	2.6	66.0	Full	1600	0.0	0.0
Approach	539	2.0		0.387		6.1	LOS A	2.6	66.0				
SouthEast: US-101 NB off-ramp													
Lane 1 ^d	55	2.0	804	0.069	100	5.2	LOS A	0.3	7.0	Full	1600	0.0	0.0
Approach	55	2.0		0.069		5.2	LOS A	0.3	7.0				
East: Broadway St													
Lane 1 ^d	241	2.0	1028	0.235	100	5.7	LOS A	1.1	28.7	Full	1600	0.0	0.0
Approach	241	2.0		0.235		5.7	LOS A	1.1	28.7				
North: San Antonio Dr													
Lane 1 ^d	378	2.0	1099	0.344	100	6.7	LOS A	1.9	48.0	Full	1600	0.0	0.0
Approach	378	2.0		0.344		6.7	LOS A	1.9	48.0				
West: San Lorenzo Park Rd													
Lane 1 ^d	14	2.0	837	0.017	100	4.5	LOS A	0.1	1.7	Full	1600	0.0	0.0
Approach	14	2.0		0.017		4.5	LOS A	0.1	1.7				
Intersection	1228	2.0		0.387		6.2	LOS A	2.6	66.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

Site: 2015 Proposed PM - Final

Broadway St, San Antonio Dr at US-101 Ramps Roundabout

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: Broadway St													
Lane 1 ^d	578	2.0	1395	0.415	100	6.5	LOS A	2.9	73.9	Full	1000	0.0	0.0
Approach	578	2.0		0.415		6.5	LOS A	2.9	73.9				
SouthEast: US-101 NB off-ramp													
Lane 1 ^d	111	2.0	774	0.143	100	6.1	LOS A	0.6	15.1	Full	900	0.0	0.0
Approach	111	2.0		0.143		6.1	LOS A	0.6	15.1				
East: Broadway St													
Lane 1 ^d	423	2.0	891	0.474	100	10.0	LOS B	2.9	73.1	Full	1600	0.0	0.0
Approach	423	2.0		0.474		10.0	LOS B	2.9	73.1				
North: San Antonio Dr													
Lane 1 ^d	276	2.0	978	0.282	100	6.5	LOS A	1.4	35.2	Full	800	0.0	0.0
Approach	276	2.0		0.282		6.5	LOS A	1.4	35.2				
West: San Lorenzo Park Rd													
Lane 1 ^d	17	2.0	820	0.021	100	4.6	LOS A	0.1	2.1	Full	1600	0.0	0.0
Approach	17	2.0		0.021		4.6	LOS A	0.1	2.1				
Intersection	1405	2.0		0.474		7.5	LOS A	2.9	73.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

Site: 2030 Proposed AM - Final

Broadway St, San Antonio Dr at US-101 Ramps
Roundabout

Lane Use and Performance													
	Demand Flows		Cap.	Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	veh/h	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Broadway St													
Lane 1 ^d	770	2.0	1388	0.554	100	8.5	LOS A	5.0	127.0	Full	1600	0.0	0.0
Approach	770	2.0		0.554		8.5	LOS A	5.0	127.0				
SouthEast: US-101 NB off-ramp													
Lane 1 ^d	78	2.0	633	0.124	100	7.1	LOS A	0.5	12.3	Full	1600	0.0	0.0
Approach	78	2.0		0.124		7.1	LOS A	0.5	12.3				
East: Broadway St													
Lane 1 ^d	345	2.0	899	0.383	100	8.4	LOS A	2.0	50.2	Full	1600	0.0	0.0
Approach	345	2.0		0.383		8.4	LOS A	2.0	50.2				
North: San Antonio Dr													
Lane 1 ^d	540	2.0	988	0.547	100	10.7	LOS B	3.9	99.4	Full	1600	0.0	0.0
Approach	540	2.0		0.547		10.7	LOS B	3.9	99.4				
West: San Lorenzo Park Rd													
Lane 1 ^d	20	2.0	670	0.029	100	5.7	LOS A	0.1	2.8	Full	1600	0.0	0.0
Approach	20	2.0		0.029		5.7	LOS A	0.1	2.8				
Intersection	1752	2.0		0.554		9.1	LOS A	5.0	127.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

Site: 2030 Proposed PM - Final

Broadway St, San Antonio Dr at US-101 Ramps Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Broadway St													
Lane 1 ^d	826	2.0	1389	0.595	100	9.3	LOS A	5.9	148.7	Full	1600	0.0	0.0
Approach	826	2.0		0.595		9.3	LOS A	5.9	148.7				
SouthEast: US-101 NB off-ramp													
Lane 1 ^d	157	2.0	598	0.262	100	9.4	LOS A	1.1	27.3	Full	1600	0.0	0.0
Approach	157	2.0		0.262		9.4	LOS A	1.1	27.3				
East: Broadway St													
Lane 1 ^d	603	2.0	733	0.823	100	27.5	LOS D	9.2	234.8	Full	1600	0.0	0.0
Approach	603	2.0		0.823		27.5	LOS D	9.2	234.8				
North: San Antonio Dr													
Lane 1 ^d	395	2.0	837	0.471	100	10.4	LOS B	2.8	71.1	Full	1600	0.0	0.0
Approach	395	2.0		0.471		10.4	LOS B	2.8	71.1				
West: San Lorenzo Park Rd													
Lane 1 ^d	24	2.0	650	0.037	100	5.9	LOS A	0.1	3.5	Full	1600	0.0	0.0
Approach	24	2.0		0.037		5.9	LOS A	0.1	3.5				
Intersection	2004	2.0		0.823		15.0	LOS B	9.2	234.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 **Site: 2040 Proposed Alt AM - Final**

Broadway St, San Antonio Dr at US-101 Ramps
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Broadway St													
Lane 1 ^d	976	2.0	1381	0.707	100	12.2	LOS B	9.2	233.9	Full	1600	0.0	0.0
Approach	976	2.0		0.707		12.2	LOS B	9.2	233.9				
SouthEast: US-101 NB off-ramp													
Lane 1 ^d	101	2.0	510	0.198	100	9.8	LOS A	0.8	19.4	Full	1600	0.0	0.0
Approach	101	2.0		0.198		9.8	LOS A	0.8	19.4				
East: Broadway St													
Lane 1 ^d	261	2.0	793	0.329	100	8.4	LOS A	1.5	39.1	Full	1600	0.0	0.0
Lane 2	175	2.0	956	0.183	100	5.5	LOS A	0.8	20.9	Short	100	0.0	0.0
Approach	436	2.0		0.329		7.2	LOS A	1.5	39.1				
North: San Antonio Dr													
Lane 1 ^d	685	2.0	897	0.763	100	19.5	LOS C	8.6	217.4	Full	1600	0.0	0.0
Approach	685	2.0		0.763		19.5	LOS C	8.6	217.4				
West: San Lorenzo Park Rd													
Lane 1 ^d	26	2.0	548	0.048	100	7.1	LOS A	0.2	4.5	Full	1600	0.0	0.0
Approach	26	2.0		0.048		7.1	LOS A	0.2	4.5				
Intersection	2224	2.0		0.763		13.3	LOS B	9.2	233.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed Alt PM - Final

Broadway St, San Antonio Dr at US-101 Ramps
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Broadway St													
Lane 1 ^d	1047	2.0	1381	0.758	100	14.0	LOS B	11.6	295.6	Full	1600	0.0	0.0
Approach	1047	2.0		0.758		14.0	LOS B	11.6	295.6				
SouthEast: US-101 NB off-ramp													
Lane 1 ^d	201	2.0	475	0.423	100	15.1	LOS C	2.0	49.6	Full	1600	0.0	0.0
Approach	201	2.0		0.423		15.1	LOS C	2.0	49.6				
East: Broadway St													
Lane 1 ^d	403	2.0	613	0.658	100	19.7	LOS C	4.6	115.9	Full	1600	0.0	0.0
Lane 2	362	2.0	790	0.458	100	10.6	LOS B	2.6	66.5	Short	100	0.0	0.0
Approach	765	2.0		0.658		15.4	LOS C	4.6	115.9				
North: San Antonio Dr													
Lane 1 ^d	500	2.0	726	0.689	100	18.7	LOS C	5.6	142.1	Full	1600	0.0	0.0
Approach	500	2.0		0.689		18.7	LOS C	5.6	142.1				
West: San Lorenzo Park Rd													
Lane 1 ^d	33	2.0	527	0.062	100	7.6	LOS A	0.2	5.8	Full	1600	0.0	0.0
Approach	33	2.0		0.062		7.6	LOS A	0.2	5.8				
Intersection	2546	2.0		0.758		15.4	LOS C	11.6	295.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Regional Intersection Control Evaluation
Section 4:

City of Marina

Appendix B4: Analysis Worksheets

Study Intersections:

- RESERVATION ROAD AT BEACH ROAD
- RESERVATION ROAD AT DEFOREST ROAD
- CARDOZA AVENUE AT ABDY WAY
- 8TH STREET AT INTER-GARRISON



RESERVATION ROAD AT BEACH ROAD

Capital Cost Worksheet

City of Marina **Capital Cost Worksheet**

MAR_04 8th Street at Inter-Garrison Road

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 1,793,000	\$ 2,296,715	\$ 503,715	\$ (151,525)	\$ 408,358	\$ 352,190	1.16
High	\$ 1,972,300	\$ 2,067,044	\$ 94,743			\$ (56,782)	(7.19)
Low	\$ 1,613,700	\$ 2,526,387	\$ 912,687			\$ 761,162	0.54
Breakeven	\$ 1,793,000	\$ 2,352,883	\$ 559,883			\$ 408,358	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAABOUT
\$ 690,117	\$ 1,250,000
\$ 940,117	\$ 1,500,000
\$ 1,190,117	\$ 1,750,000
\$ 1,440,117	\$ 2,000,000
\$ 1,690,117	\$ 2,250,000
\$ 1,940,117	\$ 2,500,000
\$ 2,190,117	\$ 2,750,000
\$ 2,440,117	\$ 3,000,000
\$ 2,690,117	\$ 3,250,000
\$ 2,940,117	\$ 3,500,000

Cost Sensitivity Assumptions

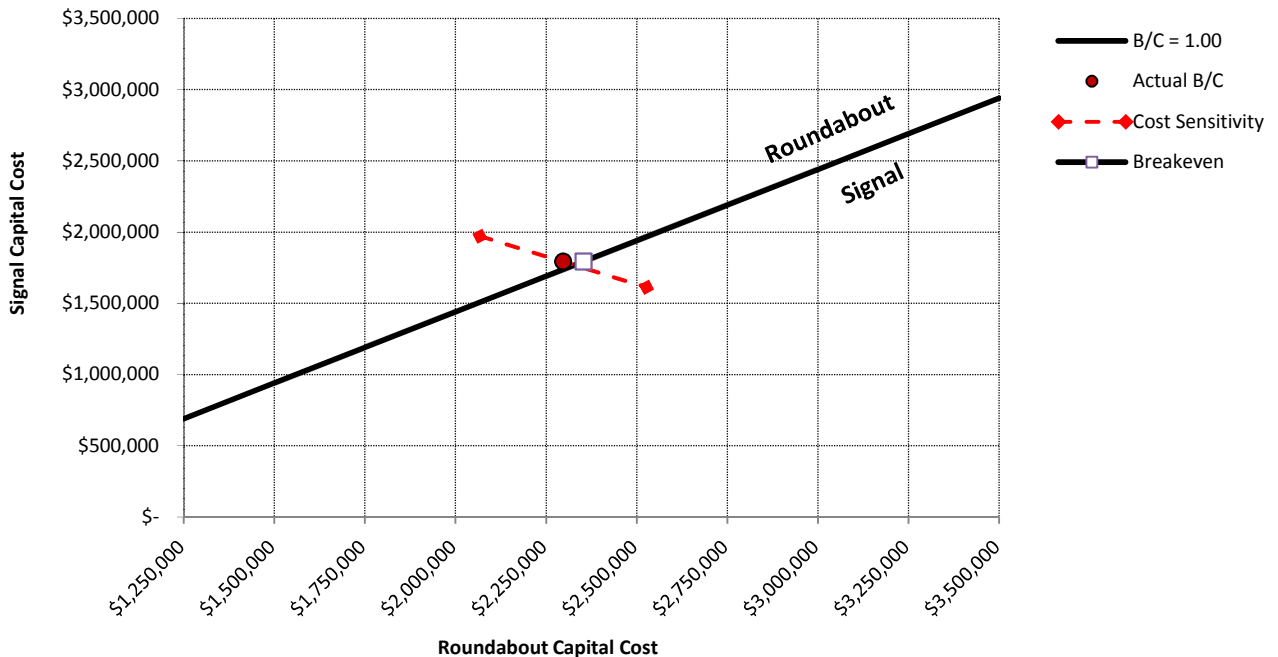
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	2%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase \$ 250,000 (x axis major unit)
 Min Signal Cost \$ 400,000 (Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



RESERVATION ROAD AT BEACH ROAD

Turning Movement Volumes

EXISTING						
AM	NB		WB		EB	
	↶	↷	↶	↑	↑	↷
EXISTING						
Vehicles	206	20	14	308	169	218
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: City of Marina Dated: December 15, 2014</i>						

CUMULATIVE						
AM	NB		WB		EB	
	↶	↷	↶	↑	↑	↷
CUMULATIVE						
Vehicles	345	33	23	515	283	365
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Kittelson & Associates, Inc. (2% Growth Rate) Dated:</i>						

RESERVATION ROAD AT BEACH ROAD

Synchro Outputs

Queues

1: Reservation Rd & Beach Rd

	→	↘	↙	←	↖
Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	184	237	15	335	246
v/c Ratio	0.15	0.21	0.08	0.26	0.43
Control Delay	5.6	1.8	23.3	4.1	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	1.8	23.3	4.1	21.7
Queue Length 50th (ft)	16	0	5	31	35
Queue Length 95th (ft)	67	30	19	68	62
Internal Link Dist (ft)	356			332	206
Turn Bay Length (ft)			125		
Base Capacity (vph)	1215	1115	514	1287	1188
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.21	0.03	0.26	0.21
Intersection Summary					

HCM 2010 Signalized Intersection Summary
 1: Reservation Rd & Beach Rd

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑	↗	↙	↑	↖	↗		
Volume (veh/h)	169	218	14	308	206	20		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900		
Adj Flow Rate, veh/h	184	237	15	335	245	0		
Adj No. of Lanes	1	1	1	1	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	0		
Cap, veh/h	1185	1008	33	1364	403	184		
Arrive On Green	0.64	0.64	0.02	0.73	0.11	0.00		
Sat Flow, veh/h	1863	1583	1774	1863	3548	1615		
Grp Volume(v), veh/h	184	237	15	335	245	0		
Grp Sat Flow(s),veh/h/ln	1863	1583	1774	1863	1774	1615		
Q Serve(g_s), s	2.1	3.3	0.4	3.0	3.4	0.0		
Cycle Q Clear(g_c), s	2.1	3.3	0.4	3.0	3.4	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1185	1008	33	1364	403	184		
V/C Ratio(X)	0.16	0.24	0.45	0.25	0.61	0.00		
Avail Cap(c_a), veh/h	1185	1008	547	1364	1299	591		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	3.8	4.0	25.2	2.3	21.9	0.0		
Incr Delay (d2), s/veh	0.3	0.5	9.3	0.4	1.5	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	1.1	1.6	0.3	1.7	1.8	0.0		
LnGrp Delay(d),s/veh	4.1	4.6	34.5	2.7	23.4	0.0		
LnGrp LOS	A	A	C	A	C			
Approach Vol, veh/h	421			350	245			
Approach Delay, s/veh	4.4			4.1	23.4			
Approach LOS	A			A	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		9.9	5.0	37.0				42.0
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		19.0	16.0	18.0				38.0
Max Q Clear Time (g_c+I1), s		5.4	2.4	5.3				5.0
Green Ext Time (p_c), s		0.7	0.0	3.2				4.1
Intersection Summary								
HCM 2010 Ctrl Delay			8.8					
HCM 2010 LOS			A					
Notes								
User approved volume balancing among the lanes for turning movement.								

Queues

1: Reservation Rd & Beach Rd



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	308	397	25	560	411
v/c Ratio	0.27	0.35	0.13	0.45	0.58
Control Delay	7.6	2.2	26.0	6.8	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	2.2	26.0	6.8	23.9
Queue Length 50th (ft)	36	0	8	78	65
Queue Length 95th (ft)	131	43	28	162	103
Internal Link Dist (ft)	356			332	206
Turn Bay Length (ft)			125		
Base Capacity (vph)	1161	1136	480	1231	1051
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.35	0.05	0.45	0.39

Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Reservation Rd & Beach Rd

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑	↗	↙	↑	↖	↗		
Volume (veh/h)	283	365	23	515	345	33		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900		
Adj Flow Rate, veh/h	308	397	25	560	409	0		
Adj No. of Lanes	1	1	1	1	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	0		
Cap, veh/h	1107	941	51	1293	579	264		
Arrive On Green	0.59	0.59	0.03	0.69	0.16	0.00		
Sat Flow, veh/h	1863	1583	1774	1863	3548	1615		
Grp Volume(v), veh/h	308	397	25	560	409	0		
Grp Sat Flow(s),veh/h/ln	1863	1583	1774	1863	1774	1615		
Q Serve(g_s), s	4.5	7.6	0.8	7.4	6.1	0.0		
Cycle Q Clear(g_c), s	4.5	7.6	0.8	7.4	6.1	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1107	941	51	1293	579	264		
V/C Ratio(X)	0.28	0.42	0.49	0.43	0.71	0.00		
Avail Cap(c_a), veh/h	1107	941	505	1293	1137	518		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	5.5	6.2	26.9	3.8	22.2	0.0		
Incr Delay (d2), s/veh	0.6	1.4	7.1	1.1	1.6	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	2.5	3.7	0.5	4.1	3.1	0.0		
LnGrp Delay(d),s/veh	6.2	7.6	34.0	4.8	23.8	0.0		
LnGrp LOS	A	A	C	A	C			
Approach Vol, veh/h	705			585	409			
Approach Delay, s/veh	6.9			6.1	23.8			
Approach LOS	A			A	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		13.2	5.6	37.4				43.0
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		18.0	16.0	19.0				39.0
Max Q Clear Time (g_c+I1), s		8.1	2.8	9.6				9.4
Green Ext Time (p_c), s		1.1	0.0	4.6				7.9
Intersection Summary								
HCM 2010 Ctrl Delay			10.7					
HCM 2010 LOS			B					
Notes								
User approved volume balancing among the lanes for turning movement.								

RESERVATION ROAD AT BEACH ROAD

Sidra Outputs

LANE SUMMARY

 Site: 2014 Proposed AM - Final

Roundabout Alt 0-0
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Reservation Rd													
Lane 1 ^d	246	2.0	1212	0.203	100	4.7	LOS A	0.8	21.1	Full	1600	0.0	0.0
Approach	246	2.0		0.203		4.7	LOS A	0.8	21.1				
East: Beach Rd													
Lane 1 ^d	350	2.0	1124	0.312	100	6.2	LOS A	1.7	42.5	Full	1400	0.0	0.0
Approach	350	2.0		0.312		6.2	LOS A	1.7	42.5				
West: Reservation Rd													
Lane 1 ^d	421	2.0	1391	0.302	100	5.2	LOS A	1.7	43.1	Full	510	0.0	0.0
Approach	421	2.0		0.302		5.2	LOS A	1.7	43.1				
Intersection	1016	2.0		0.312		5.4	LOS A	1.7	43.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Thursday, August 06, 2015 10:40:11 AM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MAR_01_Beach Rd at Reservation Rd
\Beach Road at Reservation Road.sip6

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SIDRA
INTERSECTION 6

LANE SUMMARY

Site: 2040 Proposed AM

Roundabout Alt 0-0
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Reservation Rd													
Lane 1 ^d	411	2.0	1087	0.378	100	7.2	LOS A	1.8	46.0	Full	1600	0.0	0.0
Approach	411	2.0		0.378		7.2	LOS A	1.8	46.0				
East: Beach Rd													
Lane 1 ^d	585	2.0	963	0.607	100	12.4	LOS B	4.9	124.9	Full	1400	0.0	0.0
Approach	585	2.0		0.607		12.4	LOS B	4.9	124.9				
West: Reservation Rd													
Lane 1 ^d	704	2.0	1377	0.511	100	7.9	LOS A	4.1	104.0	Full	510	0.0	0.0
Approach	704	2.0		0.511		7.9	LOS A	4.1	104.0				
Intersection	1700	2.0		0.607		9.3	LOS A	4.9	124.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Monday, August 17, 2015 12:01:31 PM

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**SIDRA
INTERSECTION 6**

RESERVATION ROAD AT DEFOREST ROAD

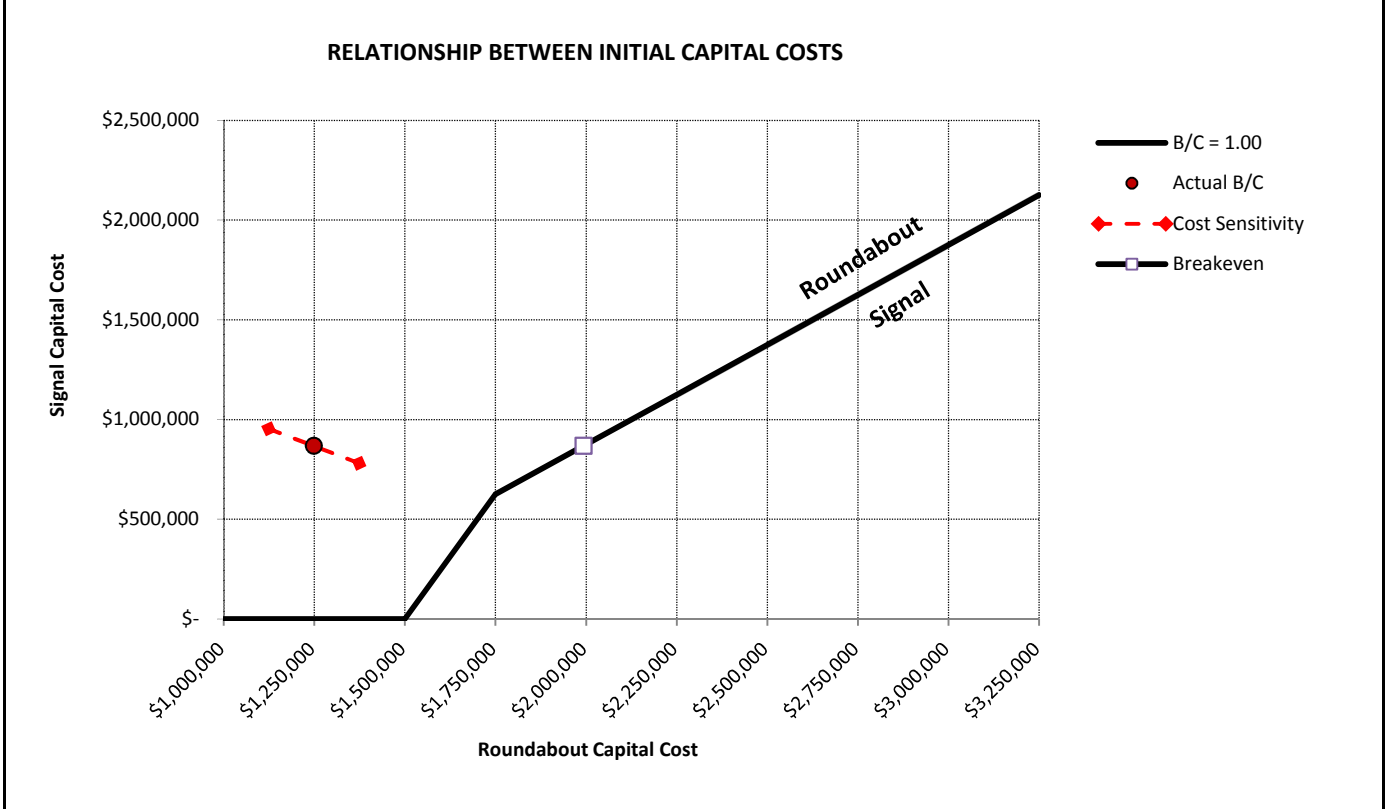
Capital Cost Worksheet

City of Marina **Capital Cost Worksheet**

MAR_02	Deforest Road at Reservation Road						
	Capital Cost			Project Constants			
	SIGNAL	ROUNDAABOUT	Added Cost for Roundabout	Added O&M Cost for Roundabout	Total Benefits	Total Costs	B/C
B/C Target	(a)	(b)	(c) = (b - a)	(d)	(e)	(f) = (c + d)	(g) = (e / f)
Actual	\$ 868,200	\$ 1,248,150	\$ 379,950	\$ (124,823)	\$ 999,860	\$ 255,127	3.92
High	\$ 955,020	\$ 1,123,335	\$ 168,315			\$ 43,492	22.99
Low	\$ 781,380	\$ 1,372,965	\$ 591,585			\$ 466,762	2.14
Breakeven	\$ 868,200	\$ 1,992,883	\$ 1,124,683			\$ 999,860	1.00
Custom 1							
Custom 2							

Capital Cost Relationship (B/C=1.00)			Cost Sensitivity Assumptions		
SIGNAL	ROUNDAABOUT		Percent Adjustment to Cost		
\$ -	\$	1,000,000	B/C Target	Signal	Roundabout
\$ -	\$	1,250,000	High	10%	-10%
\$ -	\$	1,500,000	Low	-10%	10%
\$ 625,317	\$	1,750,000	Breakeven	0%	60%
\$ 875,317	\$	2,000,000	Custom 1		
\$ 1,125,317	\$	2,250,000	Custom 2		
\$ 1,375,317	\$	2,500,000			
\$ 1,625,317	\$	2,750,000	Chart Assumptions		
\$ 1,875,317	\$	3,000,000	Cost Increase	\$ 250,000	(x axis major unit)
\$ 2,125,317	\$	3,250,000	Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00



RESERVATION ROAD AT DEFOREST ROAD

Turning Movement Volumes

EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	55	6	23	46	508	35	105	10	37	116	448	30
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

Source: City of Marina Dated: December 15, 2014

CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	83	9	35	70	770	53	159	15	56	176	679	45
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												











Source: Kittelson & Associates, Inc. (2% growth rate) Dated: February 2015

RESERVATION ROAD AT DEFOREST ROAD

Synchro Outputs

Queues

1: De Forest Rd & Reservation Rd

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	126	487	33	50	552	38	67	25	125	40
v/c Ratio	0.65	0.23	0.03	0.26	0.34	0.05	0.27	0.06	0.47	0.10
Control Delay	39.7	7.6	0.4	22.7	10.0	0.8	17.2	0.3	21.3	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	7.6	0.4	22.7	10.0	0.8	17.2	0.3	21.3	1.6
Queue Length 50th (ft)	31	23	0	12	48	0	14	0	28	0
Queue Length 95th (ft)	#102	80	2	38	91	4	38	0	64	5
Internal Link Dist (ft)		179			258		276		327	
Turn Bay Length (ft)				195		130				82
Base Capacity (vph)	195	2128	988	195	1635	780	680	913	715	913
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.23	0.03	0.26	0.34	0.05	0.10	0.03	0.17	0.04

Intersection Summary

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











HCM 2010 Signalized Intersection Summary
1: De Forest Rd & Reservation Rd

TAMC Regional ICE - Marina
Existing AM (2014)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	116	448	30	46	508	35	55	6	23	105	10	37
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	126	487	33	50	552	38	60	7	25	114	11	40
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	1190	532	84	1062	475	114	7	660	115	6	660
Arrive On Green	0.08	0.34	0.34	0.05	0.30	0.30	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	0	17	1583	0	14	1583
Grp Volume(v), veh/h	126	487	33	50	552	38	67	0	25	125	0	40
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	18	0	1583	15	0	1583
Q Serve(g_s), s	4.2	6.4	0.8	1.7	7.8	1.0	0.0	0.0	0.6	0.0	0.0	0.9
Cycle Q Clear(g_c), s	4.2	6.4	0.8	1.7	7.8	1.0	25.0	0.0	0.6	25.0	0.0	0.9
Prop In Lane	1.00		1.00	1.00		1.00	0.90		1.00	0.91		1.00
Lane Grp Cap(c), veh/h	148	1190	532	84	1062	475	121	0	660	121	0	660
V/C Ratio(X)	0.85	0.41	0.06	0.60	0.52	0.08	0.55	0.00	0.04	1.03	0.00	0.06
Avail Cap(c_a), veh/h	148	1190	532	148	1062	475	121	0	660	121	0	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.1	15.3	13.5	28.0	17.4	15.1	27.3	0.0	10.4	28.8	0.0	10.5
Incr Delay (d2), s/veh	35.3	1.0	0.2	6.7	1.8	0.3	5.4	0.0	0.0	91.6	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	0.5	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	3.5	3.3	0.4	1.0	4.0	0.5	1.3	0.0	0.2	5.1	0.0	0.4
LnGrp Delay(d),s/veh	62.4	16.4	13.7	34.7	19.2	15.4	32.7	0.0	10.4	120.8	0.0	10.5
LnGrp LOS	E	B	B	C	B	B	C		B	F		B
Approach Vol, veh/h		646			640			92				165
Approach Delay, s/veh		25.2			20.2			26.6				94.1
Approach LOS		C			C			C				F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		29.0	6.8	24.2		29.0	9.0	22.0				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0				
Max Green Setting (Gmax), s		25.0	5.0	18.0		25.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s		27.0	3.7	8.4		27.0	6.2	9.8				
Green Ext Time (p_c), s		0.0	0.0	4.7		0.0	0.0	4.2				
Intersection Summary												
HCM 2010 Ctrl Delay			30.6									
HCM 2010 LOS			C									

Queues

1: De Forest Rd & Reservation Rd

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	126	487	33	50	552	38	67	25	125	40
v/c Ratio	0.34	0.28	0.04	0.26	0.34	0.05	0.28	0.08	0.42	0.11
Control Delay	28.9	14.4	0.1	30.1	15.9	0.1	27.0	0.5	27.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	14.4	0.1	30.1	15.9	0.1	27.0	0.5	27.4	0.6
Queue Length 50th (ft)	22	68	0	17	78	0	22	0	41	0
Queue Length 95th (ft)	48	121	0	49	137	0	56	0	87	0
Internal Link Dist (ft)		179			258		276		327	
Turn Bay Length (ft)				165		80				82
Base Capacity (vph)	378	1768	845	194	1644	794	785	758	784	758
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.28	0.04	0.26	0.34	0.05	0.09	0.03	0.16	0.05
Intersection Summary										











HCM 2010 Signalized Intersection Summary
1: De Forest Rd & Reservation Rd

TAMC Regional ICE - Marina
Proposed AM (2014)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	116	448	30	46	508	35	55	6	23	105	10	37
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	126	487	33	50	552	38	60	7	25	114	11	40
Adj No. of Lanes	2	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	1560	698	89	1442	645	116	14	115	179	17	174
Arrive On Green	0.08	0.44	0.44	0.05	0.41	0.41	0.07	0.07	0.07	0.11	0.11	0.11
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1597	186	1583	1625	157	1583
Grp Volume(v), veh/h	126	487	33	50	552	38	67	0	25	125	0	40
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1783	0	1583	1782	0	1583
Q Serve(g_s), s	1.7	4.4	0.6	1.4	5.4	0.7	1.8	0.0	0.7	3.3	0.0	1.1
Cycle Q Clear(g_c), s	1.7	4.4	0.6	1.4	5.4	0.7	1.8	0.0	0.7	3.3	0.0	1.1
Prop In Lane	1.00		1.00	1.00		1.00	0.90		1.00	0.91		1.00
Lane Grp Cap(c), veh/h	288	1560	698	89	1442	645	130	0	115	196	0	174
V/C Ratio(X)	0.44	0.31	0.05	0.56	0.38	0.06	0.52	0.00	0.22	0.64	0.00	0.23
Avail Cap(c_a), veh/h	421	1560	698	217	1442	645	872	0	774	871	0	774
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.4	8.9	7.8	22.8	10.2	8.8	21.9	0.0	21.4	20.9	0.0	19.9
Incr Delay (d2), s/veh	1.0	0.5	0.1	5.4	0.8	0.2	3.1	0.0	0.9	3.4	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.8	2.2	0.3	0.8	2.8	0.3	1.0	0.0	0.3	1.8	0.0	0.5
LnGrp Delay(d),s/veh	22.4	9.4	8.0	28.2	11.0	9.0	25.1	0.0	22.4	24.3	0.0	20.6
LnGrp LOS	C	A	A	C	B	A	C		C	C		C
Approach Vol, veh/h		646			640			92				165
Approach Delay, s/veh		11.9			12.2			24.3				23.4
Approach LOS		B			B			C				C
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		7.6	6.5	25.6		9.4	8.1	24.0				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0				
Max Green Setting (Gmax), s		24.0	6.0	20.0		24.0	6.0	20.0				
Max Q Clear Time (g_c+I1), s		3.8	3.4	6.4		5.3	3.7	7.4				
Green Ext Time (p_c), s		0.4	0.0	5.9		0.7	0.1	5.6				
Intersection Summary												
HCM 2010 Ctrl Delay			14.0									
HCM 2010 LOS			B									

Queues

1: De Forest Rd & Reservation Rd

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	191	738	49	76	837	58	100	38	189	61
v/c Ratio	0.85	0.38	0.05	0.41	0.56	0.08	0.37	0.08	0.59	0.13
Control Delay	60.9	11.2	1.5	29.6	14.6	2.2	18.6	1.0	23.6	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	11.2	1.5	29.6	14.6	2.2	18.6	1.0	23.6	2.7
Queue Length 50th (ft)	54	78	0	21	97	0	23	0	46	0
Queue Length 95th (ft)	#170	150	8	#65	180	12	54	4	95	13
Internal Link Dist (ft)		179			258		276		327	
Turn Bay Length (ft)				195		130				82
Base Capacity (vph)	224	1928	904	186	1483	716	548	847	636	847
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.38	0.05	0.41	0.56	0.08	0.18	0.04	0.30	0.07

Intersection Summary

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











HCM 2010 Signalized Intersection Summary
1: De Forest Rd & Reservation Rd

TAMC Regional ICE - Marina
Future AM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	176	679	45	70	770	53	83	9	35	159	15	56
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	191	738	49	76	837	58	90	10	38	173	16	61
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	1204	539	106	1062	475	114	7	633	115	6	633
Arrive On Green	0.10	0.34	0.34	0.06	0.30	0.30	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	0	17	1583	0	14	1583
Grp Volume(v), veh/h	191	738	49	76	837	58	100	0	38	189	0	61
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	17	0	1583	14	0	1583
Q Serve(g_s), s	6.0	10.4	1.3	2.5	13.0	1.6	0.0	0.0	0.9	0.0	0.0	1.4
Cycle Q Clear(g_c), s	6.0	10.4	1.3	2.5	13.0	1.6	24.0	0.0	0.9	24.0	0.0	1.4
Prop In Lane	1.00		1.00	1.00		1.00	0.90		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	177	1204	539	106	1062	475	121	0	633	121	0	633
V/C Ratio(X)	1.08	0.61	0.09	0.72	0.79	0.12	0.83	0.00	0.06	1.57	0.00	0.10
Avail Cap(c_a), veh/h	177	1204	539	148	1062	475	121	0	633	121	0	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.0	16.5	13.5	27.7	19.3	15.3	28.4	0.0	11.1	28.9	0.0	11.2
Incr Delay (d2), s/veh	89.4	2.3	0.3	9.5	5.9	0.5	35.6	0.0	0.0	291.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	7.3	5.4	0.6	1.5	7.2	0.8	2.8	0.0	0.4	11.7	0.0	0.6
LnGrp Delay(d),s/veh	116.4	18.8	13.8	37.2	25.2	15.8	64.0	0.0	11.1	319.8	0.0	11.3
LnGrp LOS	F	B	B	D	C	B	E		B	F		B
Approach Vol, veh/h		978			971			138				250
Approach Delay, s/veh		37.7			25.6			49.4				244.6
Approach LOS		D			C			D				F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		28.0	7.6	24.4		28.0	10.0	22.0				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0				
Max Green Setting (Gmax), s		24.0	5.0	19.0		24.0	6.0	18.0				
Max Q Clear Time (g_c+I1), s		26.0	4.5	12.4		26.0	8.0	15.0				
Green Ext Time (p_c), s		0.0	0.0	4.9		0.0	0.0	2.4				
Intersection Summary												
HCM 2010 Ctrl Delay			55.5									
HCM 2010 LOS			E									

Queues

1: De Forest Rd & Reservation Rd























										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	191	738	49	76	837	58	100	38	189	61
v/c Ratio	0.67	0.53	0.07	0.51	0.67	0.09	0.38	0.12	0.55	0.15
Control Delay	43.6	19.5	0.5	44.9	22.5	1.4	30.0	0.7	29.9	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	19.5	0.5	44.9	22.5	1.4	30.0	0.7	29.9	2.4
Queue Length 50th (ft)	37	122	0	29	143	0	35	0	66	0
Queue Length 95th (ft)	#95	212	3	#93	#254	7	80	0	129	10
Internal Link Dist (ft)		179			258		276		327	
Turn Bay Length (ft)				165		80				82
Base Capacity (vph)	287	1386	686	148	1245	627	717	701	716	701
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.53	0.07	0.51	0.67	0.09	0.14	0.05	0.26	0.09

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
1: De Forest Rd & Reservation Rd

TAMC Regional ICE - Marina
Proposed AM (2035)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	176	679	45	70	770	53	83	9	35	159	15	56
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	191	738	49	76	837	58	90	10	38	173	16	61
Adj No. of Lanes	2	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	295	1431	640	111	1348	603	143	16	141	252	23	244
Arrive On Green	0.09	0.40	0.40	0.06	0.38	0.38	0.09	0.09	0.09	0.15	0.15	0.15
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1604	178	1583	1630	151	1583
Grp Volume(v), veh/h	191	738	49	76	837	58	100	0	38	189	0	61
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1783	0	1583	1781	0	1583
Q Serve(g_s), s	3.0	8.7	1.0	2.3	10.6	1.3	3.0	0.0	1.2	5.5	0.0	1.9
Cycle Q Clear(g_c), s	3.0	8.7	1.0	2.3	10.6	1.3	3.0	0.0	1.2	5.5	0.0	1.9
Prop In Lane	1.00		1.00	1.00		1.00	0.90		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	295	1431	640	111	1348	603	158	0	141	275	0	244
V/C Ratio(X)	0.65	0.52	0.08	0.69	0.62	0.10	0.63	0.00	0.27	0.69	0.00	0.25
Avail Cap(c_a), veh/h	312	1431	640	161	1348	603	776	0	689	775	0	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.4	12.4	10.1	25.3	13.8	11.0	24.3	0.0	23.5	22.1	0.0	20.5
Incr Delay (d2), s/veh	4.3	1.3	0.2	7.3	2.2	0.3	4.1	0.0	1.0	3.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.6	4.5	0.5	1.4	5.5	0.6	1.7	0.0	0.6	3.0	0.0	0.8
LnGrp Delay(d),s/veh	28.7	13.7	10.3	32.7	16.0	11.3	28.4	0.0	24.5	25.1	0.0	21.0
LnGrp LOS	C	B	B	C	B	B	C		C	C		C
Approach Vol, veh/h		978			971			138			250	
Approach Delay, s/veh		16.4			17.0			27.3			24.1	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		8.9	7.4	26.3		12.5	8.7	25.0				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0				
Max Green Setting (Gmax), s		24.0	5.0	21.0		24.0	5.0	21.0				
Max Q Clear Time (g_c+I1), s		5.0	4.3	10.7		7.5	5.0	12.6				
Green Ext Time (p_c), s		0.6	0.0	7.1		1.2	0.0	6.0				
Intersection Summary												
HCM 2010 Ctrl Delay			18.1									
HCM 2010 LOS			B									

RESERVATION ROAD AT DEFOREST ROAD

Sidra Outputs

LANE SUMMARY

 Site: 2014 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: De Forest Rd													
Lane 1 ^d	91	2.0	727	0.126	100	6.3	LOS A	0.5	11.8	Full	445	0.0	0.0
Approach	91	2.0		0.126		6.3	LOS A	0.5	11.8				
East: Reservation Rd													
Lane 1 ^d	640	2.0	1178	0.543	100	9.3	LOS A	3.7	94.2	Full	577	0.0	0.0
Approach	640	2.0		0.543		9.3	LOS A	3.7	94.2				
North: De Forest Rd													
Lane 1 ^d	165	2.0	764	0.216	100	7.1	LOS A	0.9	21.9	Full	1600	0.0	0.0
Approach	165	2.0		0.216		7.1	LOS A	0.9	21.9				
West: Reservation Rd													
Lane 1 ^d	646	2.0	1187	0.544	100	9.3	LOS A	3.9	100.0	Full	317	0.0	0.0
Approach	646	2.0		0.544		9.3	LOS A	3.9	100.0				
Intersection	1542	2.0		0.544		8.9	LOS A	3.9	100.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2035 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: De Forest Rd													
Lane 1 ^d	138	2.0	459	0.301	100	12.7	LOS B	1.2	30.8	Full	445	0.0	0.0
Approach	138	2.0		0.301		12.7	LOS B	1.2	30.8				
East: Reservation Rd													
Lane 1 ^d	971	2.0	1049	0.925	100	32.6	LOS D	22.1	561.3	Full	577	0.0	4.2
Approach	971	2.0		0.925		32.6	LOS D	22.1	561.3				
North: De Forest Rd													
Lane 1 ^d	250	2.0	507	0.493	100	16.3	LOS C	2.5	63.6	Full	1600	0.0	0.0
Approach	250	2.0		0.493		16.3	LOS C	2.5	63.6				
West: Reservation Rd													
Lane 1 ^d	978	2.0	1077	0.908	100	29.6	LOS D	20.5	521.0	Full	317	0.0	22.4
Approach	978	2.0		0.908		29.6	LOS D	20.5	521.0				
Intersection	2337	2.0		0.925		28.4	LOS D	22.1	561.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

CARDOZA AVENUE AT ABDY WAY

Capital Cost Worksheet

City of Marina **Capital Cost Worksheet**

MAR_03 **Cardoza Avenue at Abdy Way**

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAOBT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 273,400	\$ 982,675	\$ 709,275	\$ (51,499)	\$ 805,389	\$ 657,776	1.22
High	\$ 300,740	\$ 884,408	\$ 583,668			\$ 532,169	1.51
Low	\$ 246,060	\$ 1,080,943	\$ 834,883			\$ 783,384	1.03
Breakeven	\$ 273,400	\$ 1,130,288	\$ 856,888			\$ 805,389	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAOBT
\$ -	\$ 400,000
\$ -	\$ 600,000
\$ -	\$ 800,000
\$ 143,112	\$ 1,000,000
\$ 343,112	\$ 1,200,000
\$ 543,112	\$ 1,400,000
\$ 743,112	\$ 1,600,000
\$ 943,112	\$ 1,800,000
\$ 1,143,112	\$ 2,000,000
\$ 1,343,112	\$ 2,200,000

Cost Sensitivity Assumptions

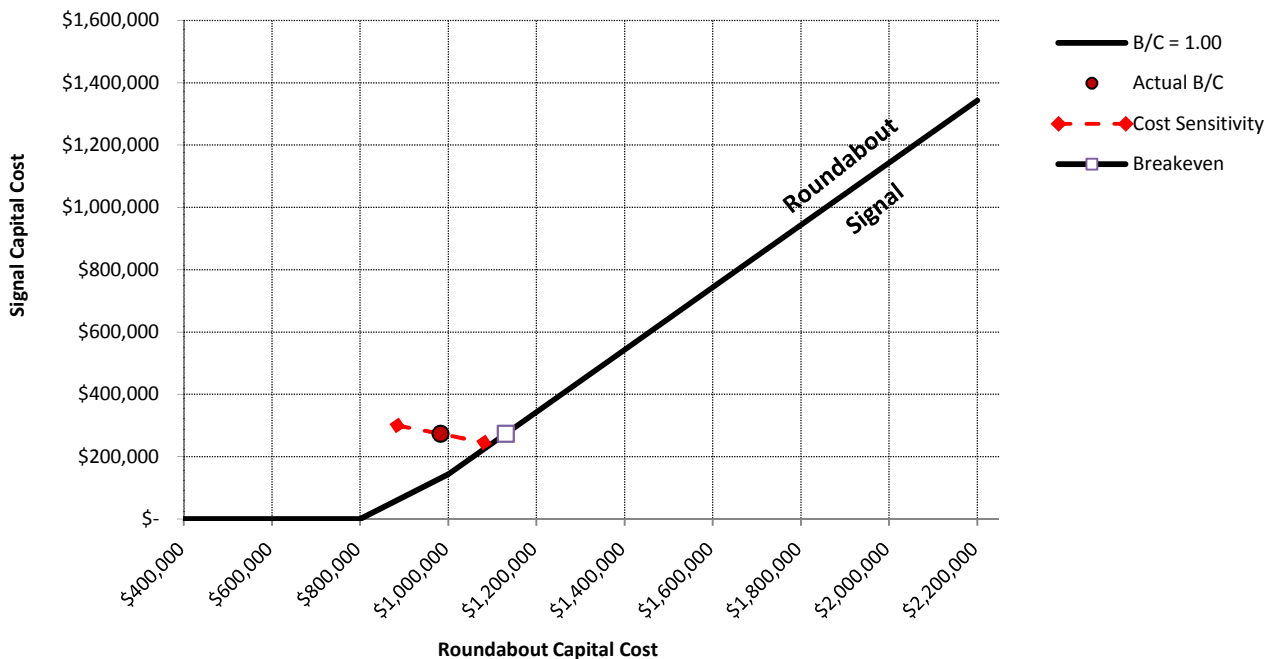
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	15%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase \$ 200,000 (x axis major unit)
 Min Signal Cost \$ - (Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



CARDOZA AVENUE AT ABDY WAY

Turning Movement Volumes

EXISTING 2014												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING 2014												
Vehicles	1	44	25	151	3	3	123	112	2	81	2	30
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

Source: City of Marina Dated: December 15, 2014

CUMULATIVE 2040												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE 2040												
Vehicles	2	74	42	253	5	5	206	187	3	136	3	50
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

Source: Kittelson & Associates, Inc. (2% growth rate) Dated: February 2015

CARDOZA AVENUE AT ABDY WAY

Synchro Outputs

Intersection												
Int Delay, s/veh	8.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	81	2	30	151	3	3	1	44	25	123	112	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	45	-	-	-	65	-	-	-	-	125
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	88	2	33	164	3	3	1	48	27	134	122	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	456	466	122	454	453	61	122	0	0	75	0	0
Stage 1	389	389	-	64	64	-	-	-	-	-	-	-
Stage 2	67	77	-	390	389	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	515	494	929	516	503	1004	1465	-	-	1524	-	-
Stage 1	635	608	-	947	842	-	-	-	-	-	-	-
Stage 2	943	831	-	634	608	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	474	447	929	460	455	1004	1465	-	-	1524	-	-
Mov Cap-2 Maneuver	474	447	-	460	455	-	-	-	-	-	-	-
Stage 1	635	551	-	946	841	-	-	-	-	-	-	-
Stage 2	936	830	-	552	551	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	13			17.2			0.1			3.9		
HCM LOS	B			C								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1465	-	-	473	929	465	1524	-	-
HCM Lane V/C Ratio	0.001	-	-	0.191	0.035	0.367	0.088	-	-
HCM Control Delay (s)	7.5	-	-	14.4	9	17.2	7.6	0	-
HCM Lane LOS	A	-	-	B	A	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.1	1.7	0.3	-	-

Intersection												
Int Delay, s/veh	40.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	136	3	50	253	5	5	2	74	42	206	187	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	45	-	-	-	65	-	-	-	-	125
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	148	3	54	275	5	5	2	80	46	224	203	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	764	781	203	761	759	103	203	0	0	126	0	0
Stage 1	651	651	-	108	108	-	-	-	-	-	-	-
Stage 2	113	130	-	653	651	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	321	326	838	322	336	952	1369	-	-	1460	-	-
Stage 1	457	465	-	897	806	-	-	-	-	-	-	-
Stage 2	892	789	-	456	465	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	272	269	838	~ 258	277	952	1369	-	-	1460	-	-
Mov Cap-2 Maneuver	272	269	-	~ 258	277	-	-	-	-	-	-	-
Stage 1	456	385	-	896	805	-	-	-	-	-	-	-
Stage 2	880	788	-	350	385	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.3	123.9	0.1	4.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1369	-	-	272	838	262	1460	-	-
HCM Lane V/C Ratio	0.002	-	-	0.555	0.065	1.091	0.153	-	-
HCM Control Delay (s)	7.6	-	-	33.6	9.6	123.9	7.9	0	-
HCM Lane LOS	A	-	-	D	A	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	3.1	0.2	12	0.5	-	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

CARDOZA AVENUE AT ABDY WAY

Sidra Outputs

LANE SUMMARY

 Site: 2014 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Cardoza Ave													
Lane 1 ^d	76	2.0	1137	0.067	100	3.7	LOS A	0.3	7.0	Full	860	0.0	0.0
Approach	76	2.0		0.067		3.7	LOS A	0.3	7.0				
East: Abdy Way													
Lane 1 ^d	171	2.0	1248	0.137	100	4.0	LOS A	0.6	14.5	Full	1600	0.0	0.0
Approach	171	2.0		0.137		4.0	LOS A	0.6	14.5				
North: Cardoza Ave													
Lane 1 ^d	255	2.0	1189	0.215	100	4.9	LOS A	1.1	27.2	Full	1600	0.0	0.0
Lane 2	2	2.0	1642	0.001	100	0.0	LOS A	0.0	0.0	Short	75	0.0	0.0
Approach	258	2.0		0.215		4.9	LOS A	1.1	27.2				
West: Abdy Way													
Lane 1 ^d	123	2.0	920	0.133	100	5.2	LOS A	0.6	14.6	Full	342	0.0	0.0
Approach	123	2.0		0.133		5.2	LOS A	0.6	14.6				
Intersection	627	2.0		0.215		4.6	LOS A	1.1	27.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	veh/h	v/c	%	sec		Veh	Dist		ft	%	%
	veh/h	%	veh/h	v/c	%	sec		Veh	ft		ft	%	%
South: Cardoza Ave													
Lane 1 ^d	128	2.0	976	0.131	100	4.9	LOS A	0.6	14.1	Full	860	0.0	0.0
Approach	128	2.0		0.131		4.9	LOS A	0.6	14.1				
East: Abdy Way													
Lane 1 ^d	286	2.0	1138	0.251	100	5.5	LOS A	1.2	29.9	Full	1600	0.0	0.0
Approach	286	2.0		0.251		5.5	LOS A	1.2	29.9				
North: Cardoza Ave													
Lane 1 ^d	427	2.0	1058	0.404	100	7.7	LOS A	2.3	58.6	Full	1600	0.0	0.0
Lane 2	3	2.0	1642	0.002	100	0.0	LOS A	0.0	0.0	Short	75	0.0	0.0
Approach	430	2.0		0.404		7.6	LOS A	2.3	58.6				
West: Abdy Way													
Lane 1 ^d	205	2.0	690	0.298	100	8.9	LOS A	1.3	33.1	Full	342	0.0	0.0
Approach	205	2.0		0.298		8.9	LOS A	1.3	33.1				
Intersection	1050	2.0		0.404		7.0	LOS A	2.3	58.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

8TH STREET AT INTER-GARRISON

Capital Cost Worksheet

City of Marina **Capital Cost Worksheet**

MAR_04 8th Street at Inter-Garrison Road

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 1,793,000	\$ 2,296,715	\$ 503,715	\$ (151,525)	\$ 408,358	\$ 352,190	1.16
High	\$ 1,972,300	\$ 2,067,044	\$ 94,743			\$ (56,782)	(7.19)
Low	\$ 1,613,700	\$ 2,526,387	\$ 912,687			\$ 761,162	0.54
Breakeven	\$ 1,793,000	\$ 2,352,883	\$ 559,883			\$ 408,358	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAABOUT
\$ 690,117	\$ 1,250,000
\$ 940,117	\$ 1,500,000
\$ 1,190,117	\$ 1,750,000
\$ 1,440,117	\$ 2,000,000
\$ 1,690,117	\$ 2,250,000
\$ 1,940,117	\$ 2,500,000
\$ 2,190,117	\$ 2,750,000
\$ 2,440,117	\$ 3,000,000
\$ 2,690,117	\$ 3,250,000
\$ 2,940,117	\$ 3,500,000

Cost Sensitivity Assumptions

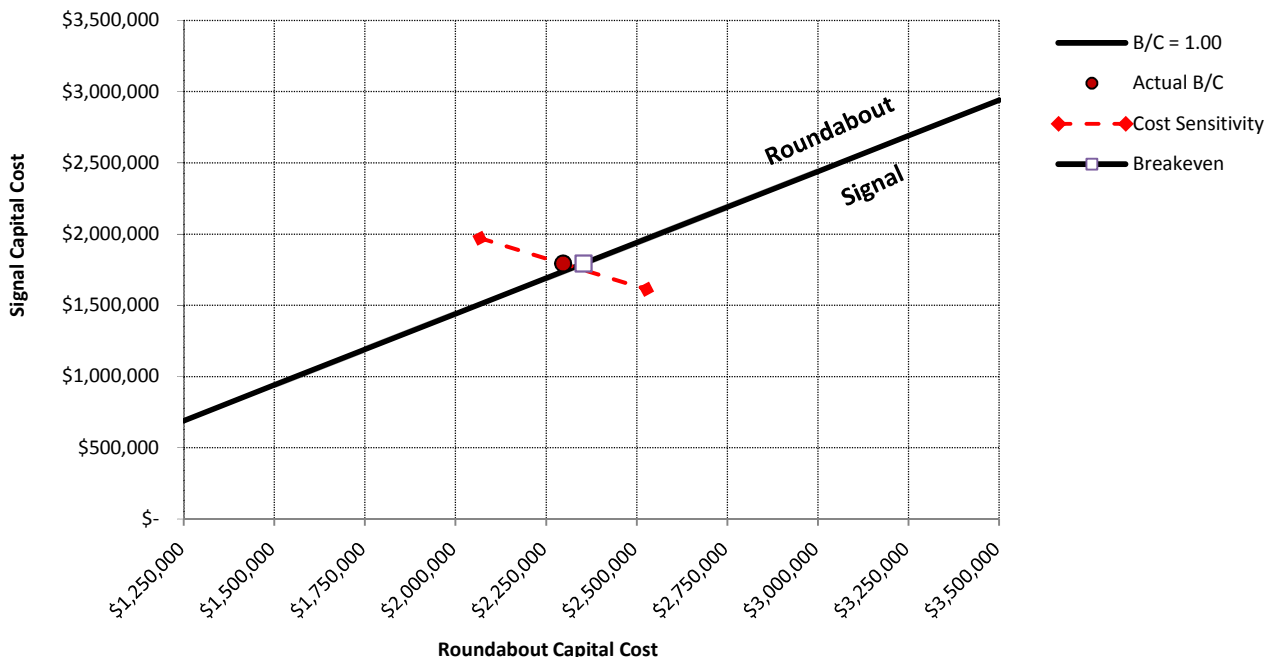
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	2%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 250,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



8TH STREET AT INTER-GARRISON

Turning Movement Volumes

EXISTING						
AM	WB		SB		EB	
	↑	↗	↖	↘	↙	↑
EXISTING						
Vehicles	153	10	7	58	445	36
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: City of Marina Dated: December 15, 2014</i>						

CUMULATIVE						
AM	WB		SB		EB	
	↑	↗	↖	↘	↙	↑
CUMULATIVE						
Vehicles	256	17	12	97	745	60
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Kittelson & Associates, Inc. (2% growth rate) D</i>						

8TH STREET AT INTER-GARRISON

Synchro Outputs

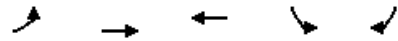
Intersection									
Intersection Delay, s/veh	13.6								
Intersection LOS	B								
Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Vol, veh/h	0	445	36	0	153	10	0	7	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	484	39	0	166	11	0	8	63
Number of Lanes	0	0	1	0	1	0	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	15.7	9.1	8.8
HCM LOS	C	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	93%	0%	100%	0%
Vol Thru, %	7%	94%	0%	0%
Vol Right, %	0%	6%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	481	163	7	58
LT Vol	445	0	7	0
Through Vol	36	153	0	0
RT Vol	0	10	0	58
Lane Flow Rate	523	177	8	63
Geometry Grp	2	2	7	7
Degree of Util (X)	0.654	0.229	0.014	0.095
Departure Headway (Hd)	4.505	4.65	6.621	5.405
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	800	771	540	661
Service Time	2.531	2.683	4.372	3.155
HCM Lane V/C Ratio	0.654	0.23	0.015	0.095
HCM Control Delay	15.7	9.1	9.5	8.7
HCM Lane LOS	C	A	A	A
HCM 95th-tile Q	5	0.9	0	0.3

Queues

1: Inter-Garrison Rd & 8th St














Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	484	39	177	8	63
v/c Ratio	0.37	0.03	0.28	0.02	0.14
Control Delay	10.4	2.3	11.8	14.3	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	2.3	11.8	14.3	6.6
Queue Length 50th (ft)	21	0	16	1	0
Queue Length 95th (ft)	86	9	72	10	22
Internal Link Dist (ft)		787	555	586	
Turn Bay Length (ft)	250				65
Base Capacity (vph)	1740	1720	1222	1168	1066
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.02	0.14	0.01	0.06

Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Inter-Garrison Rd & 8th St

TAMC Regional ICE - Marina
 Proposed AM (2014)

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	445	36	153	10	7	58		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	484	39	166	11	8	63		
Adj No. of Lanes	2	1	1	0	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	847	1084	274	18	113	101		
Arrive On Green	0.25	0.58	0.16	0.16	0.06	0.06		
Sat Flow, veh/h	3442	1863	1728	115	1774	1583		
Grp Volume(v), veh/h	484	39	0	177	8	63		
Grp Sat Flow(s),veh/h/ln	1721	1863	0	1843	1774	1583		
Q Serve(g_s), s	2.8	0.2	0.0	2.0	0.1	0.9		
Cycle Q Clear(g_c), s	2.8	0.2	0.0	2.0	0.1	0.9		
Prop In Lane	1.00			0.06	1.00	1.00		
Lane Grp Cap(c), veh/h	847	1084	0	292	113	101		
V/C Ratio(X)	0.57	0.04	0.00	0.61	0.07	0.62		
Avail Cap(c_a), veh/h	1831	2807	0	1470	1415	1263		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	7.5	2.0	0.0	8.8	9.9	10.3		
Incr Delay (d2), s/veh	0.6	0.0	0.0	2.0	0.3	6.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	1.3	0.1	0.0	1.1	0.1	0.9		
LnGrp Delay(d),s/veh	8.1	2.0	0.0	10.9	10.2	16.5		
LnGrp LOS	A	A		B	B	B		
Approach Vol, veh/h		523	177		71			
Approach Delay, s/veh		7.6	10.9		15.8			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				17.1		5.4	9.5	7.6
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				34.0		18.0	12.0	18.0
Max Q Clear Time (g_c+I1), s				2.2		2.9	4.8	4.0
Green Ext Time (p_c), s				1.1		0.1	1.0	0.8
Intersection Summary								
HCM 2010 Ctrl Delay			9.1					
HCM 2010 LOS			A					

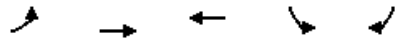
Intersection									
Intersection Delay, s/veh	40.9								
Intersection LOS	E								
Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Vol, veh/h	0	745	60	0	256	17	0	12	97
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	810	65	0	278	18	0	13	105
Number of Lanes	0	0	1	0	1	0	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	54.9	11.9	10.3
HCM LOS	F	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	93%	0%	100%	0%
Vol Thru, %	7%	94%	0%	0%
Vol Right, %	0%	6%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	805	273	12	97
LT Vol	745	0	12	0
Through Vol	60	256	0	0
RT Vol	0	17	0	97
Lane Flow Rate	875	297	13	105
Geometry Grp	2	2	7	7
Degree of Util (X)	1	0.423	0.027	0.182
Departure Headway (Hd)	4.85	5.126	7.398	6.2
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	744	703	484	579
Service Time	2.909	3.162	5.134	3.935
HCM Lane V/C Ratio	1.176	0.422	0.027	0.181
HCM Control Delay	54.9	11.9	10.3	10.3
HCM Lane LOS	F	B	B	B
HCM 95th-tile Q	16.6	2.1	0.1	0.7

Queues

1: Inter-Garrison Rd & 8th St
















Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	810	65	296	13	105
v/c Ratio	0.71	0.04	0.52	0.04	0.29
Control Delay	20.5	2.6	15.6	17.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	2.6	15.6	17.1	7.5
Queue Length 50th (ft)	88	4	57	3	0
Queue Length 95th (ft)	#221	13	119	14	31
Internal Link Dist (ft)		787	555	586	
Turn Bay Length (ft)	250				65
Base Capacity (vph)	1133	1593	918	876	836
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.71	0.04	0.32	0.01	0.13

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Inter-Garrison Rd & 8th St

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations	 				 			
Volume (veh/h)	745	60	256	17	12	97		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	810	65	278	18	13	105		
Adj No. of Lanes	2	1	1	0	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1053	1243	414	27	156	139		
Arrive On Green	0.31	0.67	0.24	0.24	0.09	0.09		
Sat Flow, veh/h	3442	1863	1731	112	1774	1583		
Grp Volume(v), veh/h	810	65	0	296	13	105		
Grp Sat Flow(s),veh/h/ln	1721	1863	0	1843	1774	1583		
Q Serve(g_s), s	7.0	0.4	0.0	4.8	0.2	2.1		
Cycle Q Clear(g_c), s	7.0	0.4	0.0	4.8	0.2	2.1		
Prop In Lane	1.00			0.06	1.00	1.00		
Lane Grp Cap(c), veh/h	1053	1243	0	440	156	139		
V/C Ratio(X)	0.77	0.05	0.00	0.67	0.08	0.75		
Avail Cap(c_a), veh/h	1264	1938	0	1015	977	872		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	10.3	1.9	0.0	11.3	13.7	14.6		
Incr Delay (d2), s/veh	2.4	0.0	0.0	1.8	0.2	8.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	3.6	0.2	0.0	2.6	0.1	2.1		
LnGrp Delay(d),s/veh	12.7	1.9	0.0	13.1	13.9	22.6		
LnGrp LOS	B	A		B	B	C		
Approach Vol, veh/h		875	296		118			
Approach Delay, s/veh		11.9	13.1		21.6			
Approach LOS		B	B		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				25.8		6.9	14.0	11.8
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				34.0		18.0	12.0	18.0
Max Q Clear Time (g_c+I1), s				2.4		4.1	9.0	6.8
Green Ext Time (p_c), s				1.9		0.3	1.0	1.4
Intersection Summary								
HCM 2010 Ctrl Delay			13.1					
HCM 2010 LOS			B					

8TH STREET AT INTER-GARRISON

Sidra Outputs

LANE SUMMARY

 Site: 2014 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: Inter-Garrison Rd													
Lane 1 ^d	177	2.0	862	0.206	100	6.3	LOS A	0.9	23.2	Full	1600	0.0	0.0
Approach	177	2.0		0.206		6.3	LOS A	0.9	23.2				
North: 8th St													
Lane 1 ^d	71	2.0	1191	0.059	100	3.5	LOS A	0.3	6.5	Full	1600	0.0	0.0
Approach	71	2.0		0.059		3.5	LOS A	0.3	6.5				
West: Inter-Garrison Rd													
Lane 1 ^d	523	2.0	1401	0.373	100	6.0	LOS A	2.5	62.6	Full	1600	0.0	0.0
Approach	523	2.0		0.373		6.0	LOS A	2.5	62.6				
Intersection	771	2.0		0.373		5.8	LOS A	2.5	62.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Friday, August 07, 2015 8:36:56 AM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MAR_04_8th St at Intergarrison\8th St at Inter Garrison Rd.sip6

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INTERSECTION 6

LANE SUMMARY

 Site: 2040 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: Inter-Garrison Rd													
Lane 1 ^d	297	2.0	618	0.480	100	13.5	LOS B	2.6	65.9	Full	1600	0.0	0.0
Approach	297	2.0		0.480		13.5	LOS B	2.6	65.9				
North: 8th St													
Lane 1 ^d	118	2.0	1063	0.111	100	4.4	LOS A	0.5	12.4	Full	1600	0.0	0.0
Approach	118	2.0		0.111		4.4	LOS A	0.5	12.4				
West: Inter-Garrison Rd													
Lane 1 ^d	875	2.0	1393	0.628	100	10.0	LOS A	6.7	170.9	Full	1600	0.0	0.0
Approach	875	2.0		0.628		10.0	LOS A	6.7	170.9				
Intersection	1290	2.0		0.628		10.3	LOS B	6.7	170.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Monday, August 17, 2015 12:53:48 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MAR_04_8th St at Intergarrison\8th St at Inter Garrison Rd.sip6

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INTERSECTION 6

Regional Intersection Control Evaluation
Section 5:

Monterey County

Appendix B5: Analysis Worksheets

Study Intersections:

- SAN MIGUEL CANYON ROAD AT CASTROVILLE BOULEVARD
- LAURLES GRADE AT CARMEL VALLEY ROAD
- HIGHWAY 68 AT CORRAL DE TIERRA



SAN MIGUEL CANYON ROAD AT CASTROVILLE BOULEVARD

Capital Cost Worksheet

Monterey County						Capital Cost Worksheet	
MCO_01 San Miguel Canyon Rd. at Castroville Blvd.							
Capital Cost				Project Constants			
B/C Target	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)	Total Costs (f) = (c + d)	B/C (g) = (e / f)
Actual	\$ 1,876,600	\$ 2,305,250	\$ 428,650	\$ (162,160)	\$ 2,061,955	\$ 266,490	7.74
High	\$ 2,064,260	\$ 2,074,725	\$ 10,465			\$ (151,695)	(13.59)
Low	\$ 1,688,940	\$ 2,535,775	\$ 846,835			\$ 684,675	3.01
Breakeven	\$ 1,876,600	\$ 4,100,715	\$ 2,224,115			\$ 2,061,955	1.00
Custom 1							
Custom 2							

Capital Cost Relationship (B/C=1.00)			Cost Sensitivity Assumptions		
SIGNAL	ROUNDAABOUT		Percent Adjustment to Cost		
B/C Target	Signal	Roundabout	B/C Target	Signal	Roundabout
	\$ -	\$ 2,000,000	High	10%	-10%
	\$ -	\$ 2,250,000	Low	-10%	10%
	\$ -	\$ 2,500,000	Breakeven	0%	78%
	\$ 525,885	\$ 2,750,000	Custom 1		
	\$ 775,885	\$ 3,000,000	Custom 2		
	\$ 1,025,885	\$ 3,250,000			
	\$ 1,275,885	\$ 3,500,000			
	\$ 1,525,885	\$ 3,750,000			
	\$ 1,775,885	\$ 4,000,000			
	\$ 2,025,885	\$ 4,250,000			

Chart Assumptions		
Cost Increase	\$ 250,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS

SAN MIGUEL CANYON ROAD AT CASTROVILLE BOULEVARD

Turning Movement Volumes

EXISTING						
AM	NB		SB		EB	
	↶	↑	↑	↷	↶	↷
EXISTING						
Vehicles	140	731	707	117	38	138
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						

PM	NB		SB		EB	
	↶	↑	↑	↷	↶	↷
EXISTING						
Vehicles	274	748	758	75	61	316
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Monterey County Dated: June 2015</i>						

CUMULATIVE						
AM	NB		SB		EB	
	↶	↑	↑	↷	↶	↷
CUMULATIVE						
Vehicles	180	937	907	150	49	177
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						

PM	NB		SB		EB	
	↶	↑	↑	↷	↶	↷
CUMULATIVE						
Vehicles	351	959	972	96	78	405
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Kittelson & Associates, Inc. (1% Growth)</i>						

SAN MIGUEL CANYON ROAD AT CASTROVILLE BOULEVARD

Synchro Outputs

Intersection

Int Delay, s/veh 4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	38	138	140	731	707	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	120	525	-	-	139
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	150	152	795	768	127

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1867	768	0
Stage 1	768	-	-
Stage 2	1099	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	80	402	846
Stage 1	458	-	-
Stage 2	319	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	66	402	846
Mov Cap-2 Maneuver	66	-	-
Stage 1	458	-	-
Stage 2	262	-	-

Approach	EB	NB	SB
HCM Control Delay, s	42.1	1.6	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	846	-	66	402	-	-
HCM Lane V/C Ratio	0.18	-	0.626	0.373	-	-
HCM Control Delay (s)	10.2	-	125.2	19.2	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0.7	-	2.7	1.7	-	-

Intersection

Int Delay, s/veh 33.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	61	316	274	748	758	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	120	525	-	-	139
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	343	298	813	824	82

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2233	824	0
Stage 1	824	-	-
Stage 2	1409	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	~ 47	373	806
Stage 1	431	-	-
Stage 2	226	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	~ 30	373	806
Mov Cap-2 Maneuver	~ 30	-	-
Stage 1	431	-	-
Stage 2	142	-	-







Approach	EB	NB	SB
HCM Control Delay, s	187.8	3.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	806	-	30	373	-	-
HCM Lane V/C Ratio	0.37	-	2.21	0.921	-	-
HCM Control Delay (s)	12.1	-\$	837.2	62.5	-	-
HCM Lane LOS	B	-	F	F	-	-
HCM 95th %tile Q(veh)	1.7	-	7.7	9.7	-	-













Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon







Queues
1: Castroville Blvd & San Miguel Canyon Road

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	41	150	152	795	768	127
v/c Ratio	0.18	0.32	0.28	0.47	0.62	0.12
Control Delay	24.1	6.1	2.5	2.6	9.1	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	6.1	2.5	2.6	9.1	1.5
Queue Length 50th (ft)	6	0	0	0	73	0
Queue Length 95th (ft)	40	37	16	115	260	15
Internal Link Dist (ft)	280			134	163	
Turn Bay Length (ft)		120	525			139
Base Capacity (vph)	229	463	538	1732	1601	1378
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	0.18	0.32	0.28	0.46	0.48	0.09
Intersection Summary						

HCM 2010 Signalized Intersection Summary
 1: Castroville Blvd & San Miguel Canyon Road

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	38	138	140	731	707	117		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	41	150	152	795	768	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	190	286	463	1345	1049	891		
Arrive On Green	0.11	0.11	0.07	0.72	0.56	0.00		
Sat Flow, veh/h	1774	1583	1774	1863	1863	1583		
Grp Volume(v), veh/h	41	150	152	795	768	0		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863	1863	1583		
Q Serve(g_s), s	1.0	4.0	1.4	9.7	14.3	0.0		
Cycle Q Clear(g_c), s	1.0	4.0	1.4	9.7	14.3	0.0		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	190	286	463	1345	1049	891		
V/C Ratio(X)	0.22	0.52	0.33	0.59	0.73	0.00		
Avail Cap(c_a), veh/h	190	286	560	1871	1473	1252		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	19.1	17.4	6.3	3.2	7.6	0.0		
Incr Delay (d2), s/veh	0.6	1.8	0.4	0.4	1.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.5	3.7	0.9	4.8	7.6	0.0		
LnGrp Delay(d),s/veh	19.7	19.1	6.7	3.6	8.8	0.0		
LnGrp LOS	B	B	A	A	A			
Approach Vol, veh/h	191			947	768			
Approach Delay, s/veh	19.2			4.1	8.8			
Approach LOS	B			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		37.8		9.0	7.4	30.3		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		47.0		5.0	6.0	37.0		
Max Q Clear Time (g_c+I1), s		11.7		6.0	3.4	16.3		
Green Ext Time (p_c), s		12.5		0.0	0.1	10.0		
Intersection Summary								
HCM 2010 Ctrl Delay			7.5					
HCM 2010 LOS			A					













Queues
1: Castroville Blvd & San Miguel Canyon Road

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	66	343	298	813	824	82
v/c Ratio	0.40	0.62	0.61	0.50	0.82	0.09
Control Delay	35.4	14.1	15.0	3.0	16.5	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	14.1	15.0	3.0	16.5	1.8
Queue Length 50th (ft)	20	38	28	61	185	0
Queue Length 95th (ft)	#73	123	#138	103	316	13
Internal Link Dist (ft)	280			134	163	
Turn Bay Length (ft)		120	525			139
Base Capacity (vph)	166	562	492	1684	1449	1250
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	0.40	0.61	0.61	0.48	0.57	0.07







Intersection Summary

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













HCM 2010 Signalized Intersection Summary
 1: Castroville Blvd & San Miguel Canyon Road

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	61	316	274	748	758	75		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	66	343	298	813	824	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	144	289	482	1409	1069	908		
Arrive On Green	0.08	0.08	0.10	0.76	0.57	0.00		
Sat Flow, veh/h	1774	1583	1774	1863	1863	1583		
Grp Volume(v), veh/h	66	343	298	813	824	0		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863	1863	1583		
Q Serve(g_s), s	1.8	4.0	2.8	9.3	16.7	0.0		
Cycle Q Clear(g_c), s	1.8	4.0	2.8	9.3	16.7	0.0		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	144	289	482	1409	1069	908		
V/C Ratio(X)	0.46	1.19	0.62	0.58	0.77	0.00		
Avail Cap(c_a), veh/h	144	289	590	1814	1360	1156		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	21.6	20.1	8.7	2.6	8.0	0.0		
Incr Delay (d2), s/veh	2.3	112.8	1.3	0.4	2.1	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	1.0	16.2	2.7	4.7	9.1	0.0		
LnGrp Delay(d),s/veh	23.9	133.0	10.0	3.0	10.1	0.0		
LnGrp LOS	C	F	A	A	B			
Approach Vol, veh/h	409		1111		824			
Approach Delay, s/veh	115.4		4.9		10.1			
Approach LOS	F		A		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	41.3		8.0		9.0		32.3	
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0	
Max Green Setting (Gmax), s	48.0		4.0		8.0		36.0	
Max Q Clear Time (g_c+I1), s	11.3		6.0		4.8		18.7	
Green Ext Time (p_c), s	13.8		0.0		0.3		9.6	
Intersection Summary								
HCM 2010 Ctrl Delay			26.0					
HCM 2010 LOS			C					







Queues
1: Castroville Blvd & San Miguel Canyon Road

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	41	150	152	795	768	127
v/c Ratio	0.13	0.25	0.22	0.26	0.40	0.14
Control Delay	17.8	3.8	2.7	1.9	8.9	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	3.8	2.7	1.9	8.9	2.9
Queue Length 50th (ft)	5	2	0	0	34	0
Queue Length 95th (ft)	33	28	24	55	132	23
Internal Link Dist (ft)	280			134	268	
Turn Bay Length (ft)		120	200			100
Base Capacity (vph)	420	741	805	3368	2943	1338
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	0.10	0.20	0.19	0.24	0.26	0.09
Intersection Summary						













HCM 2010 Signalized Intersection Summary
 1: Castroville Blvd & San Miguel Canyon Road

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	38	138	140	731	707	117		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	41	150	152	795	768	127		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	215	326	546	2358	1682	752		
Arrive On Green	0.12	0.12	0.08	0.67	0.48	0.48		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	41	150	152	795	768	127		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	0.8	3.1	1.4	3.6	5.5	1.7		
Cycle Q Clear(g_c), s	0.8	3.1	1.4	3.6	5.5	1.7		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	215	326	546	2358	1682	752		
V/C Ratio(X)	0.19	0.46	0.28	0.34	0.46	0.17		
Avail Cap(c_a), veh/h	378	471	915	4142	2730	1221		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	14.9	13.1	4.1	2.7	6.6	5.6		
Incr Delay (d2), s/veh	0.4	1.0	0.3	0.1	0.2	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.4	2.9	0.7	1.7	2.7	0.8		
LnGrp Delay(d),s/veh	15.3	14.1	4.3	2.8	6.8	5.7		
LnGrp LOS	B	B	A	A	A	A		
Approach Vol, veh/h	191			947	895			
Approach Delay, s/veh	14.4			3.0	6.7			
Approach LOS	B			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		29.0		8.5	7.2	21.9		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		44.0		8.0	11.0	29.0		
Max Q Clear Time (g_c+I1), s		5.6		5.1	3.4	7.5		
Green Ext Time (p_c), s		13.1		0.1	0.2	10.4		
Intersection Summary								
HCM 2010 Ctrl Delay			5.7					
HCM 2010 LOS			A					

Queues
1: Castroville Blvd & San Miguel Canyon Road

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	66	343	298	813	824	82
v/c Ratio	0.22	0.54	0.43	0.26	0.56	0.12
Control Delay	20.5	9.9	4.7	1.6	10.5	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	9.9	4.7	1.6	10.5	3.1
Queue Length 50th (ft)	11	31	0	0	51	0
Queue Length 95th (ft)	49	101	59	45	133	18
Internal Link Dist (ft)	280			134	296	
Turn Bay Length (ft)		120	200			100
Base Capacity (vph)	310	713	759	3406	2903	1313
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	0.21	0.48	0.39	0.24	0.28	0.06
Intersection Summary						

HCM 2010 Signalized Intersection Summary
 1: Castroville Blvd & San Miguel Canyon Road

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	61	316	274	748	758	75		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	66	343	298	813	824	82		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	245	419	571	2400	1626	728		
Arrive On Green	0.14	0.14	0.13	0.68	0.46	0.46		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	66	343	298	813	824	82		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	1.4	6.0	3.2	4.2	7.1	1.3		
Cycle Q Clear(g_c), s	1.4	6.0	3.2	4.2	7.1	1.3		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	245	419	571	2400	1626	728		
V/C Ratio(X)	0.27	0.82	0.52	0.34	0.51	0.11		
Avail Cap(c_a), veh/h	245	419	796	3744	2523	1129		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	16.8	15.0	5.4	2.9	8.3	6.7		
Incr Delay (d2), s/veh	0.6	12.1	0.7	0.1	0.2	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.7	8.6	1.6	1.9	3.5	0.6		
LnGrp Delay(d),s/veh	17.4	27.2	6.1	3.0	8.5	6.8		
LnGrp LOS	B	C	A	A	A	A		
Approach Vol, veh/h	409		1111		906			
Approach Delay, s/veh	25.6		3.9		8.4			
Approach LOS	C		A		A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	33.5		10.0		9.5		24.0	
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0	
Max Green Setting (Gmax), s	46.0		6.0		11.0		31.0	
Max Q Clear Time (g_c+I1), s	6.2		8.0		5.2		9.1	
Green Ext Time (p_c), s	13.8		0.0		0.4		10.8	
Intersection Summary								
HCM 2010 Ctrl Delay			9.2					
HCM 2010 LOS			A					

Intersection

Int Delay, s/veh 19.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	49	177	180	937	907	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	120	525	-	-	139
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	192	196	1018	986	163

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2396	986	0
Stage 1	986	-	-
Stage 2	1410	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	~ 37	301	701
Stage 1	361	-	-
Stage 2	226	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	~ 27	301	701
Mov Cap-2 Maneuver	~ 27	-	-
Stage 1	361	-	-
Stage 2	163	-	-

Approach	EB	NB	SB
HCM Control Delay, s	194	2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	701	-	27	301	-	-
HCM Lane V/C Ratio	0.279	-	1.973	0.639	-	-
HCM Control Delay (s)	12.1	-	\$ 764.9	35.9	-	-
HCM Lane LOS	B	-	F	E	-	-
HCM 95th %tile Q(veh)	1.1	-	6.4	4.1	-	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 190.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	78	405	351	959	972	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	120	525	-	-	139
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	440	382	1042	1057	104

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2862	1057	0
Stage 1	1057	-	-
Stage 2	1805	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	~ 19	~ 273	659
Stage 1	334	-	-
Stage 2	144	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	~ 8	~ 273	659
Mov Cap-2 Maneuver	~ 8	-	-
Stage 1	334	-	-
Stage 2	~ 61	-	-







Approach	EB	NB	SB
HCM Control Delay, s	\$ 1116.1	4.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	659	-	8	273	-	-
HCM Lane V/C Ratio	0.579	-	10.598	1.613	-	-
HCM Control Delay (s)	17.7	-	\$ 5224	\$ 325	-	-
HCM Lane LOS	C	-	F	F	-	-
HCM 95th %tile Q(veh)	3.7	-	12.2	27	-	-

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon













Queues
1: Castroville Blvd & San Miguel Canyon Road

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	53	192	196	1018	986	163
v/c Ratio	0.38	0.45	0.55	0.62	0.82	0.15
Control Delay	35.3	10.8	13.0	4.2	15.9	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	10.8	13.0	4.2	15.9	1.3
Queue Length 50th (ft)	19	15	9	94	233	0
Queue Length 95th (ft)	#56	61	#81	173	#511	16
Internal Link Dist (ft)	280			134	163	
Turn Bay Length (ft)		120	525			139
Base Capacity (vph)	140	426	354	1639	1392	1224
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	0.38	0.45	0.55	0.62	0.71	0.13







Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Castroville Blvd & San Miguel Canyon Road

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	49	177	180	937	907	150		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	53	192	196	1018	986	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	131	227	385	1451	1184	1006		
Arrive On Green	0.07	0.07	0.07	0.78	0.64	0.00		
Sat Flow, veh/h	1774	1583	1774	1863	1863	1583		
Grp Volume(v), veh/h	53	192	196	1018	986	0		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863	1863	1583		
Q Serve(g_s), s	1.5	4.0	1.7	14.5	22.3	0.0		
Cycle Q Clear(g_c), s	1.5	4.0	1.7	14.5	22.3	0.0		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	131	227	385	1451	1184	1006		
V/C Ratio(X)	0.41	0.85	0.51	0.70	0.83	0.00		
Avail Cap(c_a), veh/h	131	227	457	1646	1303	1108		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	24.0	22.7	10.3	2.9	7.7	0.0		
Incr Delay (d2), s/veh	2.0	24.3	1.0	1.2	4.4	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.8	6.9	2.1	7.5	12.4	0.0		
LnGrp Delay(d),s/veh	26.0	46.9	11.3	4.1	12.1	0.0		
LnGrp LOS	C	D	B	A	B			
Approach Vol, veh/h	245			1214	986			
Approach Delay, s/veh	42.4			5.3	12.1			
Approach LOS	D			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		46.3		8.0	7.8	38.5		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		48.0		4.0	6.0	38.0		
Max Q Clear Time (g_c+I1), s		16.5		6.0	3.7	24.3		
Green Ext Time (p_c), s		18.4		0.0	0.1	10.3		
Intersection Summary								
HCM 2010 Ctrl Delay			11.7					
HCM 2010 LOS			B					













Queues
1: Castroville Blvd & San Miguel Canyon Road

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	85	440	382	1042	1057	104
v/c Ratio	0.91	0.81	0.90	0.66	0.94	0.11
Control Delay	115.1	33.3	47.0	4.6	31.0	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	115.1	33.3	47.0	4.6	31.0	2.6
Queue Length 50th (ft)	43	155	132	100	408	5
Queue Length 95th (ft)	#131	#318	#299	163	#731	21
Internal Link Dist (ft)	280			134	163	
Turn Bay Length (ft)		120	525			139
Base Capacity (vph)	93	543	425	1651	1231	1072
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	0.91	0.81	0.90	0.63	0.86	0.10







Intersection Summary

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













HCM 2010 Signalized Intersection Summary
 1: Castroville Blvd & San Miguel Canyon Road

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	78	405	351	959	972	96		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	85	440	382	1042	1057	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	98	296	431	1553	1205	1024		
Arrive On Green	0.06	0.06	0.13	0.83	0.65	0.00		
Sat Flow, veh/h	1774	1583	1774	1863	1863	1583		
Grp Volume(v), veh/h	85	440	382	1042	1057	0		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863	1863	1583		
Q Serve(g_s), s	3.4	4.0	7.0	15.2	33.5	0.0		
Cycle Q Clear(g_c), s	3.4	4.0	7.0	15.2	33.5	0.0		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	98	296	431	1553	1205	1024		
V/C Ratio(X)	0.86	1.48	0.89	0.67	0.88	0.00		
Avail Cap(c_a), veh/h	98	296	541	1754	1290	1096		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	33.8	29.3	19.5	2.3	10.4	0.0		
Incr Delay (d2), s/veh	50.5	235.4	13.9	0.9	6.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	3.1	30.1	9.0	7.6	19.0	0.0		
LnGrp Delay(d),s/veh	84.3	264.7	33.4	3.1	17.3	0.0		
LnGrp LOS	F	F	C	A	B			
Approach Vol, veh/h	525		1424		1057			
Approach Delay, s/veh	235.5		11.2		17.3			
Approach LOS	F		B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	64.2		8.0		13.5		50.7	
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0	
Max Green Setting (Gmax), s	68.0		4.0		14.0		50.0	
Max Q Clear Time (g_c+I1), s	17.2		6.0		9.0		35.5	
Green Ext Time (p_c), s	25.8		0.0		0.5		11.2	
Intersection Summary								
HCM 2010 Ctrl Delay			52.5					
HCM 2010 LOS			D					







Queues
1: Castroville Blvd & San Miguel Canyon Road

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	53	192	196	1018	986	163
v/c Ratio	0.21	0.37	0.33	0.32	0.54	0.18
Control Delay	22.7	9.3	2.9	1.6	9.4	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	9.3	2.9	1.6	9.4	2.4
Queue Length 50th (ft)	9	17	0	0	56	0
Queue Length 95th (ft)	46	64	23	59	163	23
Internal Link Dist (ft)	280			134	288	
Turn Bay Length (ft)		120	200			100
Base Capacity (vph)	264	605	677	3301	2666	1233
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	0.20	0.32	0.29	0.31	0.37	0.13
Intersection Summary						

HCM 2010 Signalized Intersection Summary
 1: Castroville Blvd & San Miguel Canyon Road

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	49	177	180	937	907	150		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	53	192	196	1018	986	163		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	233	344	473	2453	1839	823		
Arrive On Green	0.13	0.13	0.09	0.69	0.52	0.52		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	53	192	196	1018	986	163		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	1.2	4.9	2.0	5.7	8.5	2.5		
Cycle Q Clear(g_c), s	1.2	4.9	2.0	5.7	8.5	2.5		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	233	344	473	2453	1839	823		
V/C Ratio(X)	0.23	0.56	0.41	0.42	0.54	0.20		
Avail Cap(c_a), veh/h	233	344	749	3570	2406	1076		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	17.7	15.9	5.2	3.0	7.3	5.9		
Incr Delay (d2), s/veh	0.5	2.0	0.6	0.1	0.2	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.6	4.5	1.0	2.7	4.2	1.1		
LnGrp Delay(d),s/veh	18.2	17.9	5.7	3.1	7.5	6.0		
LnGrp LOS	B	B	A	A	A	A		
Approach Vol, veh/h	245			1214	1149			
Approach Delay, s/veh	18.0			3.6	7.3			
Approach LOS	B			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		35.6		10.0	7.9	27.7		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		46.0		6.0	11.0	31.0		
Max Q Clear Time (g_c+I1), s		7.7		6.9	4.0	10.5		
Green Ext Time (p_c), s		19.0		0.0	0.3	13.2		
Intersection Summary								
HCM 2010 Ctrl Delay			6.6					
HCM 2010 LOS			A					













Queues
1: Castroville Blvd & San Miguel Canyon Road

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	85	440	382	1042	1057	104
v/c Ratio	0.37	0.67	0.56	0.34	0.71	0.14
Control Delay	29.7	16.9	10.1	2.1	16.0	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	16.9	10.1	2.1	16.0	4.0
Queue Length 50th (ft)	29	100	49	43	160	2
Queue Length 95th (ft)	#70	186	127	61	224	25
Internal Link Dist (ft)	280			134	286	
Turn Bay Length (ft)		120	200			100
Base Capacity (vph)	236	775	796	3050	1964	921
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	0.36	0.57	0.48	0.34	0.54	0.11

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Castroville Blvd & San Miguel Canyon Road

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	78	405	351	959	972	96		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	85	440	382	1042	1057	104		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	226	442	538	2488	1649	738		
Arrive On Green	0.13	0.13	0.15	0.70	0.47	0.47		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	85	440	382	1042	1057	104		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	2.1	6.0	4.4	5.8	10.7	1.8		
Cycle Q Clear(g_c), s	2.1	6.0	4.4	5.8	10.7	1.8		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	226	442	538	2488	1649	738		
V/C Ratio(X)	0.38	0.99	0.71	0.42	0.64	0.14		
Avail Cap(c_a), veh/h	226	442	907	3453	1876	839		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	18.9	17.0	7.9	2.9	9.6	7.2		
Incr Delay (d2), s/veh	1.0	41.2	1.8	0.1	0.6	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	1.1	15.0	2.8	2.8	5.3	0.8		
LnGrp Delay(d),s/veh	19.9	58.2	9.6	3.1	10.2	7.3		
LnGrp LOS	B	E	A	A	B	A		
Approach Vol, veh/h	525			1424	1161			
Approach Delay, s/veh	52.0			4.8	9.9			
Approach LOS	D			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		37.2		10.0	11.2	26.0		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		46.0		6.0	17.0	25.0		
Max Q Clear Time (g_c+I1), s		7.8		8.0	6.4	12.7		
Green Ext Time (p_c), s		19.8		0.0	0.8	9.3		
Intersection Summary								
HCM 2010 Ctrl Delay			14.7					
HCM 2010 LOS			B					

SAN MIGUEL CANYON ROAD AT CASTROVILLE BOULEVARD

Sidra Outputs

LANE SUMMARY

 Site: 2015 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: San Miguel Canyon Road													
Lane 1 ^d	645	2.0	1354	0.477	100	7.4	LOS A	3.6	91.8	Short	200	0.0	0.0
Lane 2	301	2.0	1354	0.223	47 ⁶	4.5	LOS A	1.2	29.9	Full	1600	0.0	0.0
Approach	947	2.0		0.477		6.5	LOS A	3.6	91.8				
North: San Miguel Canyon Road													
Lane 1 ^d	605	2.0	1209	0.501	100	8.4	LOS A	3.6	90.2	Full	1600	0.0	0.0
Lane 2	290	2.0	1209	0.240	48 ⁶	5.1	LOS A	1.2	31.4	Short	200	0.0	0.0
Approach	896	2.0		0.501		7.4	LOS A	3.6	90.2				
West: Castroville Boulevard													
Lane 1	41	2.0	734	0.056	100	5.5	LOS A	0.2	6.0	Short	150	0.0	0.0
Lane 2 ^d	150	2.0	794	0.189	100	6.5	LOS A	0.8	20.3	Full	1600	0.0	0.0
Approach	191	2.0		0.189		6.3	LOS A	0.8	20.3				
Intersection	2034	2.0		0.501		6.9	LOS A	3.6	91.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

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SIDRA INTERSECTION 6.0.24.4877 www.sidrasolutions.com

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCO_01_San Miguel Canyon Rd at

Castroville Blvd\San Miguel Canyon Road at Castroville Blvd.sip6

8001045, 6019192, KITTELSON AND ASSOCIATES INC, PLUS / Floating

SIDRA
INTERSECTION 6

LANE SUMMARY

 Site: 2015 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: San Miguel Canyon Road													
Lane 1 ^d	757	2.0	1319	0.574	100	9.2	LOS A	5.0	128.1	Short	200	0.0	0.0
Lane 2	354	2.0	1319	0.268	47 ⁶	5.1	LOS A	1.5	37.6	Full	1600	0.0	0.0
Approach	1111	2.0		0.574		7.9	LOS A	5.0	128.1				
North: San Miguel Canyon Road													
Lane 1 ^d	612	2.0	1042	0.587	100	11.2	LOS B	4.6	117.7	Full	1600	0.0	0.0
Lane 2	293	2.0	1042	0.282	48 ⁶	6.2	LOS A	1.4	36.0	Short	200	0.0	0.0
Approach	905	2.0		0.587		9.6	LOS A	4.6	117.7				
West: Castroville Boulevard													
Lane 1	66	2.0	694	0.096	100	6.2	LOS A	0.4	10.3	Short	150	0.0	0.0
Lane 2 ^d	343	2.0	755	0.455	100	11.0	LOS B	2.5	63.2	Full	1600	0.0	0.0
Approach	410	2.0		0.455		10.2	LOS B	2.5	63.2				
Intersection	2426	2.0		0.587		8.9	LOS A	5.0	128.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: San Miguel Canyon Road													
Lane 1 ^d	828	2.0	1337	0.619	100	10.1	LOS B	6.1	154.4	Short	200	0.0	0.0
Lane 2	386	2.0	1337	0.289	47 ⁶	5.2	LOS A	1.6	41.9	Full	1600	0.0	0.0
Approach	1214	2.0		0.619		8.5	LOS A	6.1	154.4				
North: San Miguel Canyon Road													
Lane 1 ^d	777	2.0	1156	0.672	100	12.6	LOS B	6.5	164.1	Full	1600	0.0	0.0
Lane 2	372	2.0	1156	0.322	48 ⁶	6.2	LOS A	1.8	45.0	Short	200	0.0	0.0
Approach	1149	2.0		0.672		10.5	LOS B	6.5	164.1				
West: Castroville Boulevard													
Lane 1	53	2.0	588	0.091	100	7.2	LOS A	0.4	9.4	Short	150	0.0	0.0
Lane 2 ^d	192	2.0	650	0.296	100	9.3	LOS A	1.3	31.9	Full	1600	0.0	0.0
Approach	246	2.0		0.296		8.9	LOS A	1.3	31.9				
Intersection	2609	2.0		0.672		9.4	LOS A	6.5	164.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: San Miguel Canyon Road													
Lane 1 ^d	971	2.0	1295	0.750	100	14.3	LOS B	9.6	242.7	Short	200	0.0	11.0
Lane 2	453	2.0	1295	0.350	47 ⁶	6.0	LOS A	2.1	53.9	Full	1600	0.0	0.0
Approach	1424	2.0		0.750		11.7	LOS B	9.6	242.7				
North: San Miguel Canyon Road													
Lane 1 ^d	785	2.0	957	0.820	100	22.4	LOS C	11.5	292.5	Full	1600	0.0	0.0
Lane 2	376	2.0	957	0.393	48 ⁶	8.1	LOS A	2.1	53.5	Short	200	0.0	0.0
Approach	1161	2.0		0.820		17.8	LOS C	11.5	292.5				
West: Castroville Boulevard													
Lane 1	85	2.0	547	0.155	100	8.6	LOS A	0.6	16.2	Short	150	0.0	0.0
Lane 2 ^d	440	2.0	610	0.722	100	23.3	LOS C	5.3	134.6	Full	1600	0.0	0.0
Approach	525	2.0		0.722		21.0	LOS C	5.3	134.6				
Intersection	3110	2.0		0.820		15.5	LOS C	11.5	292.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

LAURLES GRADE AT CARMEL VALLEY ROAD

Capital Cost Worksheet

Monterey County **Capital Cost Worksheet**

MCO_02 **Laurles Grade at Carmel Valley Rd**

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 2,078,700	\$ 2,178,995	\$ 100,295	\$ (173,967)	\$ 518,989	\$ (73,672)	(7.04)
High	\$ 2,286,570	\$ 1,961,096	\$ (325,475)			\$ (499,441)	(1.04)
Low	\$ 1,870,830	\$ 2,396,895	\$ 526,065			\$ 352,098	1.47
Breakeven	\$ 2,078,700	\$ 2,771,656	\$ 692,956			\$ 518,989	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

	SIGNAL	ROUNDAABOUT
\$	1,007,044	\$ 1,700,000
\$	1,207,044	\$ 1,900,000
\$	1,407,044	\$ 2,100,000
\$	1,607,044	\$ 2,300,000
\$	1,807,044	\$ 2,500,000
\$	2,007,044	\$ 2,700,000
\$	2,207,044	\$ 2,900,000
\$	2,407,044	\$ 3,100,000
\$	2,607,044	\$ 3,300,000
\$	2,807,044	\$ 3,500,000

Cost Sensitivity Assumptions

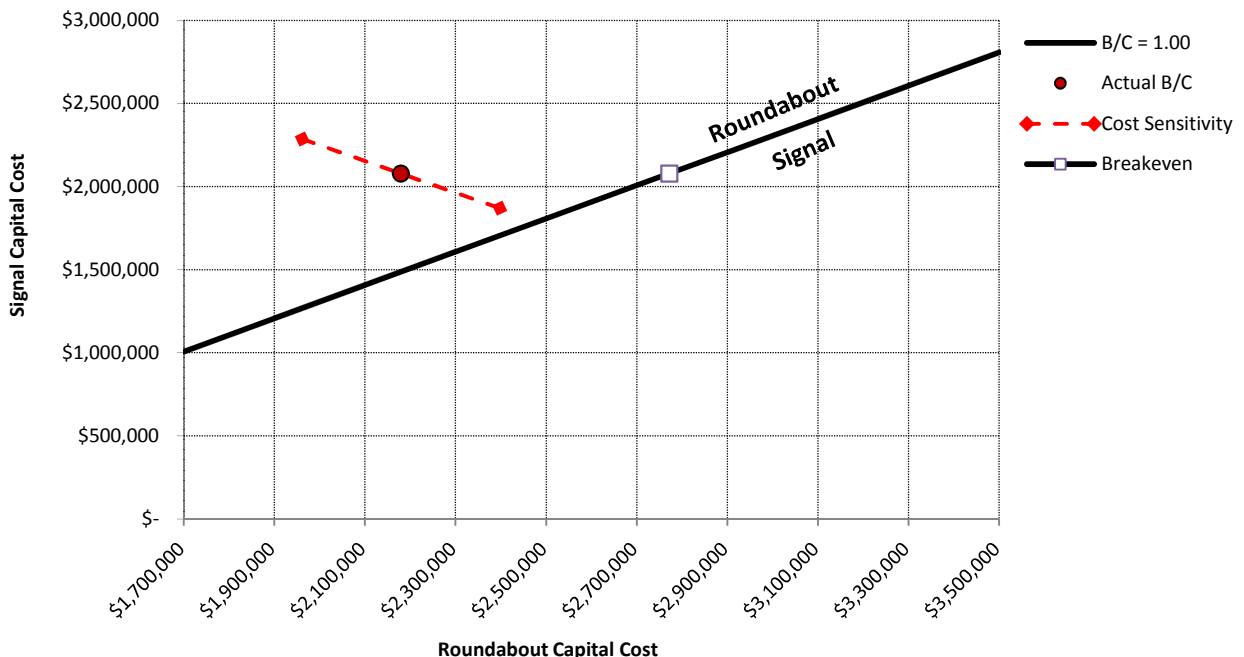
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	27%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 200,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



LAURLES GRADE AT CARMEL VALLEY ROAD

Turning Movement Volumes

EXISTING						
AM	WB		SB		EB	
	↑	↻	↶	↷	↶	↑
EXISTING						
Vehicles	403	190	142	132	87	205
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
PM	WB		SB		EB	
	↑	↻	↶	↷	↶	↑
EXISTING 2011						
Vehicles	252	147	161	106	166	445
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Monterey County Dated: 2011</i>						
CUMULATIVE						
AM	WB		SB		EB	
	↑	↻	↶	↷	↶	↑
CUMULATIVE						
Vehicles	522	246	184	171	113	266
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
PM	WB		SB		EB	
	↑	↻	↶	↷	↶	↑
CUMULATIVE 2040						
Vehicles	326	190	209	137	215	576
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Kittelson & Associates Inc (1% growth rate)</i>						

LAURLES GRADE AT CARMEL VALLEY ROAD

Synchro Outputs

Intersection

Int Delay, s/veh 10.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	87	205	403	190	142	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	230	-	-	100	0	30
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	80	80	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	256	504	238	187	174

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	504	0	978
Stage 1	-	-	504
Stage 2	-	-	474
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1061	-	568
Stage 1	-	-	607
Stage 2	-	-	626
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1061	-	568
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	607
Stage 2	-	-	562

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	34.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1061	-	-	249	568
HCM Lane V/C Ratio	0.102	-	-	0.75	0.306
HCM Control Delay (s)	8.8	-	-	52.9	14.1
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.3	-	-	5.3	1.3

Intersection

Int Delay, s/veh 17.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	166	445	252	147	161	106
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	230	-	-	100	0	30
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	93	93	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	191	511	271	158	177	116

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	271	0	1164
Stage 1	-	-	271
Stage 2	-	-	893
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1292	-	768
Stage 1	-	-	775
Stage 2	-	-	400
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1292	-	768
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	775
Stage 2	-	-	341

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	70.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1292	-	-	183	768
HCM Lane V/C Ratio	0.148	-	-	0.967	0.152
HCM Control Delay (s)	8.3	-	-	110	10.5
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.5	-	-	7.8	0.5

Queues
1: Carmel Valley Rd & Laureles Gr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	109	256	504	238	187	174
v/c Ratio	0.28	0.27	0.52	0.26	0.41	0.32
Control Delay	7.9	6.3	8.7	1.8	14.4	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	6.3	8.7	1.8	14.4	4.6
Queue Length 50th (ft)	10	22	51	0	24	0
Queue Length 95th (ft)	32	55	114	16	67	21
Internal Link Dist (ft)		424	402		437	
Turn Bay Length (ft)	230			100		30
Base Capacity (vph)	675	1660	1660	1436	948	928
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	0.16	0.15	0.30	0.17	0.20	0.19

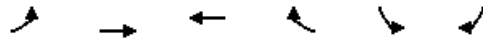
Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Carmel Valley Rd & Laureles Gr

Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	87	205	403	190	142	132		
Number	1	6	2	12	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	109	256	504	0	187	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.80	0.80	0.80	0.80	0.76	0.76		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	614	1002	1002	852	254	227		
Arrive On Green	0.54	0.54	0.54	0.00	0.14	0.00		
Sat Flow, veh/h	891	1863	1863	1583	1774	1583		
Grp Volume(v), veh/h	109	256	504	0	187	0		
Grp Sat Flow(s),veh/h/ln	891	1863	1863	1583	1774	1583		
Q Serve(g_s), s	2.2	1.8	4.3	0.0	2.5	0.0		
Cycle Q Clear(g_c), s	6.5	1.8	4.3	0.0	2.5	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	614	1002	1002	852	254	227		
V/C Ratio(X)	0.18	0.26	0.50	0.00	0.74	0.00		
Avail Cap(c_a), veh/h	1307	2451	2451	2083	1344	1199		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00		
Uniform Delay (d), s/veh	5.7	3.1	3.7	0.0	10.3	0.0		
Incr Delay (d2), s/veh	0.1	0.1	0.4	0.0	4.1	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.5	1.0	2.2	0.0	1.5	0.0		
LnGrp Delay(d),s/veh	5.9	3.2	4.1	0.0	14.4	0.0		
LnGrp LOS	A	A	A		B			
Approach Vol, veh/h		365	504		187			
Approach Delay, s/veh		4.0	4.1		14.4			
Approach LOS		A	A		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		17.5				17.5		7.6
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		33.0				33.0		19.0
Max Q Clear Time (g_c+I1), s		6.3				8.5		4.5
Green Ext Time (p_c), s		5.1				5.0		0.4
Intersection Summary								
HCM 2010 Ctrl Delay			5.9					
HCM 2010 LOS			A					

Queues













1: Carmel Valley Rd & Laureles Gr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	191	511	271	158	177	116
v/c Ratio	0.29	0.46	0.24	0.16	0.38	0.23
Control Delay	7.1	7.6	5.9	1.7	13.8	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	7.6	5.9	1.7	13.8	4.6
Queue Length 50th (ft)	17	52	23	0	22	0
Queue Length 95th (ft)	53	130	66	18	77	26
Internal Link Dist (ft)		424	402		437	
Turn Bay Length (ft)	230			100		30
Base Capacity (vph)	1020	1719	1719	1473	1023	964
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	0.19	0.30	0.16	0.11	0.17	0.12

Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Carmel Valley Rd & Laureles Gr

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	166	445	252	147	161	106		
Number	1	6	2	12	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	191	511	271	0	177	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.87	0.87	0.93	0.93	0.91	0.91		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	794	968	968	823	239	214		
Arrive On Green	0.52	0.52	0.52	0.00	0.13	0.00		
Sat Flow, veh/h	1104	1863	1863	1583	1774	1583		
Grp Volume(v), veh/h	191	511	271	0	177	0		
Grp Sat Flow(s),veh/h/ln	1104	1863	1863	1583	1774	1583		
Q Serve(g_s), s	2.7	4.2	1.9	0.0	2.2	0.0		
Cycle Q Clear(g_c), s	4.6	4.2	1.9	0.0	2.2	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	794	968	968	823	239	214		
V/C Ratio(X)	0.24	0.53	0.28	0.00	0.74	0.00		
Avail Cap(c_a), veh/h	1793	2654	2654	2256	1455	1299		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00		
Uniform Delay (d), s/veh	4.4	3.7	3.1	0.0	9.6	0.0		
Incr Delay (d2), s/veh	0.2	0.4	0.2	0.0	4.5	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.8	2.2	0.9	0.0	1.4	0.0		
LnGrp Delay(d),s/veh	4.6	4.1	3.3	0.0	14.1	0.0		
LnGrp LOS	A	A	A		B			
Approach Vol, veh/h		702	271		177			
Approach Delay, s/veh		4.3	3.3		14.1			
Approach LOS		A	A		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		16.0				16.0		7.1
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		33.0				33.0		19.0
Max Q Clear Time (g_c+I1), s		3.9				6.6		4.2
Green Ext Time (p_c), s		5.5				5.4		0.4
Intersection Summary								
HCM 2010 Ctrl Delay			5.5					
HCM 2010 LOS			A					

Intersection

Int Delay, s/veh 20.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	113	266	522	246	184	171
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	230	-	-	100	0	30
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	93	93	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	130	306	561	265	202	188

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	561	0	561
Stage 1	-	-	561
Stage 2	-	-	566
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1010	-	527
Stage 1	-	-	571
Stage 2	-	-	568
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1010	-	527
Mov Cap-2 Maneuver	-	-	527
Stage 1	-	-	571
Stage 2	-	-	495

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	70.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1010	-	-	197	527
HCM Lane V/C Ratio	0.129	-	-	1.026	0.357
HCM Control Delay (s)	9.1	-	-	121.3	15.6
HCM Lane LOS	A	-	-	F	C
HCM 95th %tile Q(veh)	0.4	-	-	9	1.6

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 89.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	215	576	326	190	209	137
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	230	-	-	100	0	30
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	93	93	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	247	662	351	204	230	151

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	351	0	1507
Stage 1	-	-	351
Stage 2	-	-	1156
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1208	-	~ 133
Stage 1	-	-	713
Stage 2	-	-	300
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1208	-	~ 106
Mov Cap-2 Maneuver	-	-	~ 106
Stage 1	-	-	713
Stage 2	-	-	239

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	\$ 379.6
HCM LOS			F

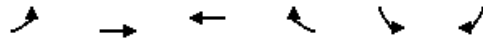
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1208	-	-	106	692
HCM Lane V/C Ratio	0.205	-	-	2.167	0.218
HCM Control Delay (s)	8.7	-	-\$ 620.9	11.6	
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.8	-	-	19.8	0.8

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues













1: Carmel Valley Rd & Laureles Gr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	130	306	561	265	202	188
v/c Ratio	0.37	0.31	0.57	0.28	0.44	0.35
Control Delay	9.7	6.7	9.4	1.8	16.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	6.7	9.4	1.8	16.0	5.2
Queue Length 50th (ft)	13	29	64	0	30	1
Queue Length 95th (ft)	48	78	170	24	99	38
Internal Link Dist (ft)		424	402		437	
Turn Bay Length (ft)	230			100		30
Base Capacity (vph)	573	1590	1590	1389	893	887
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	0.23	0.19	0.35	0.19	0.23	0.21

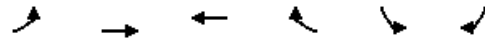
Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Carmel Valley Rd & Laureles Gr

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	113	266	522	246	184	171		
Number	1	6	2	12	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	130	306	561	0	202	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.87	0.87	0.93	0.93	0.91	0.91		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	573	1059	1059	901	274	245		
Arrive On Green	0.57	0.57	0.57	0.00	0.15	0.00		
Sat Flow, veh/h	845	1863	1863	1583	1774	1583		
Grp Volume(v), veh/h	130	306	561	0	202	0		
Grp Sat Flow(s),veh/h/ln	845	1863	1863	1583	1774	1583		
Q Serve(g_s), s	3.2	2.5	5.4	0.0	3.1	0.0		
Cycle Q Clear(g_c), s	8.6	2.5	5.4	0.0	3.1	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	573	1059	1059	901	274	245		
V/C Ratio(X)	0.23	0.29	0.53	0.00	0.74	0.00		
Avail Cap(c_a), veh/h	1056	2125	2125	1807	1165	1040		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00		
Uniform Delay (d), s/veh	6.5	3.2	3.8	0.0	11.7	0.0		
Incr Delay (d2), s/veh	0.2	0.1	0.4	0.0	3.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.8	1.2	2.8	0.0	1.8	0.0		
LnGrp Delay(d),s/veh	6.7	3.4	4.3	0.0	15.5	0.0		
LnGrp LOS	A	A	A		B			
Approach Vol, veh/h		436	561		202			
Approach Delay, s/veh		4.4	4.3		15.5			
Approach LOS		A	A		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		20.4				20.4		8.5
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		33.0				33.0		19.0
Max Q Clear Time (g_c+I1), s		7.4				10.6		5.1
Green Ext Time (p_c), s		6.1				5.8		0.4
Intersection Summary								
HCM 2010 Ctrl Delay			6.2					
HCM 2010 LOS			A					

Queues

1: Carmel Valley Rd & Laureles Gr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	247	662	351	204	230	151
v/c Ratio	0.45	0.64	0.34	0.21	0.51	0.31
Control Delay	9.4	10.6	6.8	1.7	19.2	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	10.6	6.8	1.7	19.2	7.2
Queue Length 50th (ft)	28	89	37	0	40	5
Queue Length 95th (ft)	84	211	98	21	125	45
Internal Link Dist (ft)		424	402		437	
Turn Bay Length (ft)	230			100		30
Base Capacity (vph)	819	1530	1530	1336	717	713
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	0.30	0.43	0.23	0.15	0.32	0.21

Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Carmel Valley Rd & Laureles Gr

Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	215	576	326	190	209	137		
Number	1	6	2	12	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	247	662	351	0	230	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.87	0.87	0.93	0.93	0.91	0.91		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	714	1067	1067	907	309	276		
Arrive On Green	0.57	0.57	0.57	0.00	0.17	0.00		
Sat Flow, veh/h	1026	1863	1863	1583	1774	1583		
Grp Volume(v), veh/h	247	662	351	0	230	0		
Grp Sat Flow(s),veh/h/ln	1026	1863	1863	1583	1774	1583		
Q Serve(g_s), s	5.3	7.4	3.1	0.0	3.9	0.0		
Cycle Q Clear(g_c), s	8.4	7.4	3.1	0.0	3.9	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	714	1067	1067	907	309	276		
V/C Ratio(X)	0.35	0.62	0.33	0.00	0.74	0.00		
Avail Cap(c_a), veh/h	1262	2063	2063	1754	954	852		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00		
Uniform Delay (d), s/veh	5.8	4.5	3.6	0.0	12.4	0.0		
Incr Delay (d2), s/veh	0.3	0.6	0.2	0.0	3.6	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	1.5	3.9	1.6	0.0	2.2	0.0		
LnGrp Delay(d),s/veh	6.1	5.1	3.7	0.0	15.9	0.0		
LnGrp LOS	A	A	A		B			
Approach Vol, veh/h		909	351		230			
Approach Delay, s/veh		5.3	3.7		15.9			
Approach LOS		A	A		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		22.1				22.1		9.5
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		35.0				35.0		17.0
Max Q Clear Time (g_c+I1), s		5.1				10.4		5.9
Green Ext Time (p_c), s		8.1				7.7		0.5
Intersection Summary								
HCM 2010 Ctrl Delay			6.6					
HCM 2010 LOS			A					

LAURLES GRADE AT CARMEL VALLEY ROAD

Sidra Outputs

LANE SUMMARY

 Site: 2011 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: Carmel Valley Road													
Lane 1 ^d	645	2.0	1302	0.495	100	7.9	LOS A	3.8	95.8	Full	1600	0.0	0.0
Approach	645	2.0		0.495		7.9	LOS A	3.8	95.8				
North: Laureles Grade													
Lane 1 ^d	298	2.0	921	0.323	100	7.4	LOS A	1.6	41.2	Full	1600	0.0	0.0
Approach	298	2.0		0.323		7.4	LOS A	1.6	41.2				
West: Carmel Valley Road													
Lane 1 ^d	317	2.0	1226	0.259	100	5.3	LOS A	1.4	35.2	Full	1600	0.0	0.0
Approach	317	2.0		0.259		5.3	LOS A	1.4	35.2				
Intersection	1260	2.0		0.495		7.1	LOS A	3.8	95.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Monday, August 17, 2015 3:18:59 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCO_02_Laureles Gr at Carmel Valley

Rd\Laureles Grade at Carmel Valley Road.sip6

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2011 Proposed PM- Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: Carmel Valley Road													
Lane 1 ^d	434	2.0	1194	0.363	100	6.5	LOS A	2.2	54.8	Full	1600	0.0	0.0
Approach	434	2.0		0.363		6.5	LOS A	2.2	54.8				
North: Laureles Grade													
Lane 1 ^d	290	2.0	1087	0.267	100	5.9	LOS A	1.4	34.7	Full	1600	0.0	0.0
Approach	290	2.0		0.267		5.9	LOS A	1.4	34.7				
West: Carmel Valley Road													
Lane 1 ^d	664	2.0	1200	0.553	100	9.4	LOS A	4.3	108.3	Full	1600	0.0	0.0
Approach	664	2.0		0.553		9.4	LOS A	4.3	108.3				
Intersection	1388	2.0		0.553		7.8	LOS A	4.3	108.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Friday, August 07, 2015 1:13:14 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCO_02_Laureles Gr at Carmel Valley

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2040 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: Carmel Valley Road													
Lane 1 ^d	835	2.0	1265	0.660	100	11.5	LOS B	6.6	167.0	Full	1600	0.0	0.0
Approach	835	2.0		0.660		11.5	LOS B	6.6	167.0				
North: Laureles Grade													
Lane 1 ^d	386	2.0	809	0.477	100	10.8	LOS B	2.9	73.0	Full	1600	0.0	0.0
Approach	386	2.0		0.477		10.8	LOS B	2.9	73.0				
West: Carmel Valley Road													
Lane 1 ^d	412	2.0	1171	0.352	100	6.5	LOS A	2.0	51.8	Full	1600	0.0	0.0
Approach	412	2.0		0.352		6.5	LOS A	2.0	51.8				
Intersection	1633	2.0		0.660		10.1	LOS B	6.6	167.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCO_02_Laureles Gr at Carmel Valley

Rd\Laureles Grade at Carmel Valley Road.sip6

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2040 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: Carmel Valley Road													
Lane 1 ^d	561	2.0	1132	0.496	100	8.7	LOS A	3.3	84.9	Full	1600	0.0	0.0
Approach	561	2.0		0.496		8.7	LOS A	3.3	84.9				
North: Laureles Grade													
Lane 1 ^d	376	2.0	1002	0.375	100	7.6	LOS A	2.0	52.1	Full	1600	0.0	0.0
Approach	376	2.0		0.375		7.6	LOS A	2.0	52.1				
West: Carmel Valley Road													
Lane 1 ^d	860	2.0	1139	0.755	100	15.9	LOS C	9.8	250.1	Full	1600	0.0	0.0
Approach	860	2.0		0.755		15.9	LOS C	9.8	250.1				
Intersection	1797	2.0		0.755		11.9	LOS B	9.8	250.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Monday, August 17, 2015 3:18:25 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCO_02_Laureles Gr at Carmel Valley

Rd\Laureles Grade at Carmel Valley Road.sip6

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SIDRA
INTERSECTION 6

HIGHWAY 68 AT CORRAL DE TIERRA

Capital Cost Worksheet

Monterey County **Capital Cost Worksheet**

MCO_03 Highway 68 at Corral de Tierra

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAOBT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 1,700,000	\$ 3,455,240	\$ 1,755,240	\$ (111,356)	\$ 13,280,337	\$ 1,643,884	8.08
High	\$ 1,870,000	\$ 3,109,716	\$ 1,239,716			\$ 1,128,360	11.77
Low	\$ 1,530,000	\$ 3,800,764	\$ 2,270,764			\$ 2,159,408	6.15
Breakeven	\$ 1,700,000	\$ 15,091,693	\$ 13,391,693			\$ 13,280,337	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAOBT
\$ -	\$ 2,000,000
\$ -	\$ 4,000,000
\$ -	\$ 6,000,000
\$ -	\$ 8,000,000
\$ -	\$ 10,000,000
\$ -	\$ 12,000,000
\$ 608,307	\$ 14,000,000
\$ 2,608,307	\$ 16,000,000
\$ 4,608,307	\$ 18,000,000
\$ 6,608,307	\$ 20,000,000

Cost Sensitivity Assumptions

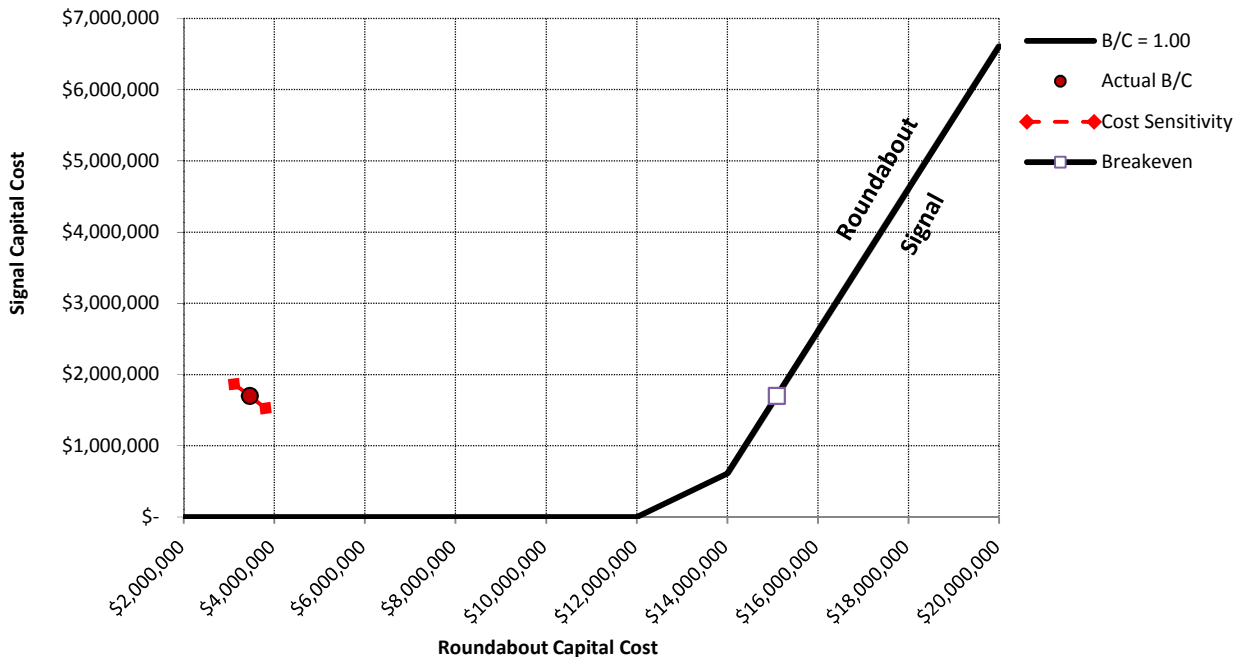
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	337%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 2,000,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



HIGHWAY 68 AT CORRAL DE TIERRA

Turning Movement Volumes

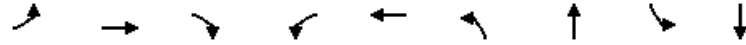
CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	156	1	306	175	1741	13	8	1	5	2	1391	78
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	4%	2%	6%	2%	4%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	165	1	163	233	1576	7	4	1	4	1	1852	179
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
Source: Wood Rodgers Report	2/24/2005											

HIGHWAY 68 AT CORRAL DE TIERRA

Synchro Outputs

Queues
1: Corral de Tierra & Highway 68



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	1512	85	190	1906	170	334	9	5
v/c Ratio	0.03	1.50	0.09	0.65	1.41	0.66	0.87	0.15	0.03
Control Delay	56.5	255.1	3.3	59.8	207.8	61.4	51.9	62.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.5	255.1	3.3	59.8	207.8	61.4	51.9	62.2	0.2
Queue Length 50th (ft)	2	~1624	1	138	~1969	119	162	7	0
Queue Length 95th (ft)	11	#1888	25	#361	#2499	#333	267	25	0
Internal Link Dist (ft)		551			568		261		232
Turn Bay Length (ft)	405		405	245		150		150	
Base Capacity (vph)	78	1009	895	294	1355	257	452	59	382
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	1.50	0.09	0.65	1.41	0.66	0.74	0.15	0.01

Intersection Summary










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

HCM 2010 Signalized Intersection Summary
 1: Corral de Tierra & Highway 68

TAMC Regional ICE - Monterey County
 Future AM (2025)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	1391	78	175	1741	13	156	1	306	8	0	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	2	1512	85	190	1892	14	170	1	333	9	0	5
Adj No. of Lanes	1	1	1	1	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	1056	898	118	1167	9	103	1	354	15	0	276
Arrive On Green	0.00	0.57	0.57	0.07	0.63	0.63	0.06	0.22	0.22	0.01	0.00	0.17
Sat Flow, veh/h	1774	1863	1583	1774	1847	14	1774	5	1579	1774	0	1583
Grp Volume(v), veh/h	2	1512	85	190	0	1906	170	0	334	9	0	5
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1860	1774	0	1584	1774	0	1583
Q Serve(g_s), s	0.1	68.1	2.9	8.0	0.0	75.8	7.0	0.0	24.9	0.6	0.0	0.3
Cycle Q Clear(g_c), s	0.1	68.1	2.9	8.0	0.0	75.8	7.0	0.0	24.9	0.6	0.0	0.3
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	4	1056	898	118	0	1175	103	0	355	15	0	276
V/C Ratio(X)	0.52	1.43	0.09	1.61	0.00	1.62	1.64	0.00	0.94	0.59	0.00	0.02
Avail Cap(c_a), veh/h	59	1056	898	118	0	1175	103	0	356	59	0	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	59.8	26.0	11.9	56.0	0.0	22.1	56.5	0.0	45.8	59.3	0.0	41.0
Incr Delay (d2), s/veh	81.4	199.5	0.2	308.6	0.0	283.8	328.4	0.0	32.6	30.9	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(-26165%),veh/ln	0.2	93.2	1.3	14.0	0.0	131.2	12.9	0.0	14.1	0.4	0.0	0.1
LnGrp Delay(d),s/veh	141.3	225.5	12.1	364.6	0.0	305.9	384.9	0.0	78.3	90.2	0.0	41.0
LnGrp LOS	F	F	B	F		F	F		E	F		D
Approach Vol, veh/h		1599			2096			504				14
Approach Delay, s/veh		214.0			311.2			181.7				72.7
Approach LOS		F			F			F				E
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.0	30.9	12.0	72.1	11.0	24.9	4.3	79.8				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	27.0	8.0	65.0	7.0	24.0	4.0	69.0				
Max Q Clear Time (g_c+I1), s	2.6	26.9	10.0	70.1	9.0	2.3	2.1	77.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			258.1									
HCM 2010 LOS			F									

Queues
1: Corral de Tierra & Highway 68

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1	2013	195	253	1721	179	177	4	4
v/c Ratio	0.01	1.98	0.21	0.56	1.13	1.43	0.69	0.07	0.02
Control Delay	55.0	466.5	6.1	46.7	83.7	273.7	29.9	58.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	466.5	6.1	46.7	83.7	273.7	29.9	58.8	0.2
Queue Length 50th (ft)	1	~2391	26	171	~1489	~179	35	3	0
Queue Length 95th (ft)	7	#2705	67	#346	#2075	#352	104	15	0
Internal Link Dist (ft)		551			568		261		232
Turn Bay Length (ft)	405		405	245		150		150	
Base Capacity (vph)	83	1017	917	448	1519	125	457	59	411
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	1.98	0.21	0.56	1.13	1.43	0.39	0.07	0.01

Intersection Summary










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

HCM 2010 Signalized Intersection Summary
 1: Corral de Tierra & Highway 68

TAMC Regional ICE - Monterey County
 Future PM (2025)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1852	179	233	1576	7	165	0	163	4	0	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	1	2013	195	253	1713	8	179	0	177	4	0	4
Adj No. of Lanes	1	1	1	1	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	2	1221	1038	133	1351	6	103	0	209	7	0	123
Arrive On Green	0.00	0.66	0.66	0.08	0.73	0.73	0.06	0.00	0.13	0.00	0.00	0.08
Sat Flow, veh/h	1774	1863	1583	1774	1853	9	1774	0	1583	1774	0	1583
Grp Volume(v), veh/h	1	2013	195	253	0	1721	179	0	177	4	0	4
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1861	1774	0	1583	1774	0	1583
Q Serve(g_s), s	0.1	78.7	5.8	9.0	0.0	87.5	7.0	0.0	13.1	0.3	0.0	0.3
Cycle Q Clear(g_c), s	0.1	78.7	5.8	9.0	0.0	87.5	7.0	0.0	13.1	0.3	0.0	0.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	2	1221	1038	133	0	1358	103	0	209	7	0	123
V/C Ratio(X)	0.52	1.65	0.19	1.90	0.00	1.27	1.73	0.00	0.85	0.54	0.00	0.03
Avail Cap(c_a), veh/h	59	1221	1038	133	0	1358	103	0	356	59	0	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	59.9	20.7	8.1	55.5	0.0	16.2	56.5	0.0	50.9	59.6	0.0	51.2
Incr Delay (d2), s/veh	132.8	295.6	0.4	432.4	0.0	126.4	365.4	0.0	9.1	50.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.1	140.3	2.6	20.4	0.0	91.8	13.9	0.0	6.3	0.2	0.0	0.1
LnGrp Delay(d),s/veh	192.7	316.3	8.5	487.9	0.0	142.7	421.9	0.0	60.0	109.8	0.0	51.3
LnGrp LOS	F	F	A	F		F	F		E	F		D
Approach Vol, veh/h		2209			1974			356				8
Approach Delay, s/veh		289.0			186.9			242.0				80.5
Approach LOS		F			F			F				F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.5	19.8	13.0	82.7	11.0	13.3	4.1	91.5				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	27.0	9.0	64.0	7.0	24.0	4.0	69.0				
Max Q Clear Time (g_c+I1), s	2.3	15.1	11.0	80.7	9.0	2.3	2.1	89.5				
Green Ext Time (p_c), s	0.0	0.8	0.0	0.0	0.0	1.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			240.7									
HCM 2010 LOS			F									

Queues
1: Corral de Tierra & Highway 68

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	1512	85	190	1906	170	334	9	5
v/c Ratio	0.03	1.36	0.09	0.50	1.41	0.66	0.87	0.15	0.03
Control Delay	56.5	192.9	2.9	56.3	207.8	61.4	51.9	62.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.5	192.9	2.9	56.3	207.8	61.4	51.9	62.2	0.2
Queue Length 50th (ft)	2	~1551	1	71	~1969	119	162	7	0
Queue Length 95th (ft)	11	#1851	23	#175	#2499	#333	267	25	0
Internal Link Dist (ft)		551			568		261		232
Turn Bay Length (ft)	405		405	245		150		150	
Base Capacity (vph)	78	1111	977	382	1355	257	452	59	382
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	1.36	0.09	0.50	1.41	0.66	0.74	0.15	0.01

Intersection Summary










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

HCM 2010 Signalized Intersection Summary
 1: Corral de Tierra & Highway 68

TAMC Regional ICE - Monterey County
 Proposed AM (2025)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	1391	78	175	1741	13	156	1	306	8	0	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	2	1512	85	190	1892	14	170	1	333	9	0	5
Adj No. of Lanes	1	1	1	2	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	1103	938	143	1167	9	103	1	354	15	0	276
Arrive On Green	0.00	0.59	0.59	0.04	0.63	0.63	0.06	0.22	0.22	0.01	0.00	0.17
Sat Flow, veh/h	1774	1863	1583	3442	1847	14	1774	5	1579	1774	0	1583
Grp Volume(v), veh/h	2	1512	85	190	0	1906	170	0	334	9	0	5
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	0	1860	1774	0	1584	1774	0	1583
Q Serve(g_s), s	0.1	71.1	2.8	5.0	0.0	75.8	7.0	0.0	24.9	0.6	0.0	0.3
Cycle Q Clear(g_c), s	0.1	71.1	2.8	5.0	0.0	75.8	7.0	0.0	24.9	0.6	0.0	0.3
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	4	1103	938	143	0	1175	103	0	355	15	0	276
V/C Ratio(X)	0.52	1.37	0.09	1.32	0.00	1.62	1.64	0.00	0.94	0.59	0.00	0.02
Avail Cap(c_a), veh/h	59	1103	938	143	0	1175	103	0	356	59	0	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	59.8	24.5	10.5	57.5	0.0	22.1	56.5	0.0	45.8	59.3	0.0	41.0
Incr Delay (d2), s/veh	81.4	172.7	0.2	186.4	0.0	283.8	328.4	0.0	32.6	30.9	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(-26165%),veh/ln	0.2	89.1	1.3	6.1	0.0	131.2	12.9	0.0	14.1	0.4	0.0	0.1
LnGrp Delay(d),s/veh	141.3	197.1	10.7	243.9	0.0	305.9	384.9	0.0	78.3	90.2	0.0	41.0
LnGrp LOS	F	F	B	F		F	F		E	F		D
Approach Vol, veh/h		1599			2096			504				14
Approach Delay, s/veh		187.2			300.3			181.7				72.7
Approach LOS		F			F			F				E
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.0	30.9	9.0	75.1	11.0	24.9	4.3	79.8				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	27.0	5.0	68.0	7.0	24.0	4.0	69.0				
Max Q Clear Time (g_c+I1), s	2.6	26.9	7.0	73.1	9.0	2.3	2.1	77.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			242.4									
HCM 2010 LOS			F									

Queues
1: Corral de Tierra & Highway 68

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1	2013	195	253	1721	179	177	4	4
v/c Ratio	0.01	1.70	0.19	0.47	1.14	1.35	0.70	0.07	0.02
Control Delay	55.0	342.4	4.8	50.1	88.0	237.5	34.5	58.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	342.4	4.8	50.1	88.0	237.5	34.5	58.8	0.2
Queue Length 50th (ft)	1	~2246	21	93	~1504	~165	46	3	0
Queue Length 95th (ft)	7	#2667	65	140	#2089	#352	116	15	0
Internal Link Dist (ft)		551			568		261		232
Turn Bay Length (ft)	405		405	245		150		150	
Base Capacity (vph)	83	1181	1045	544	1506	133	445	59	382
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	1.70	0.19	0.47	1.14	1.35	0.40	0.07	0.01

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Corral de Tierra & Highway 68

TAMC Regional ICE - Monterey County
 Proposed PM (2025)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1852	179	233	1576	7	165	0	163	4	0	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	1	2013	195	253	1713	8	179	0	177	4	0	4
Adj No. of Lanes	1	1	1	2	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	2	1268	1077	172	1351	6	103	0	209	7	0	123
Arrive On Green	0.00	0.68	0.68	0.05	0.73	0.73	0.06	0.00	0.13	0.00	0.00	0.08
Sat Flow, veh/h	1774	1863	1583	3442	1853	9	1774	0	1583	1774	0	1583
Grp Volume(v), veh/h	1	2013	195	253	0	1721	179	0	177	4	0	4
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	0	1861	1774	0	1583	1774	0	1583
Q Serve(g_s), s	0.1	81.7	5.4	6.0	0.0	87.5	7.0	0.0	13.1	0.3	0.0	0.3
Cycle Q Clear(g_c), s	0.1	81.7	5.4	6.0	0.0	87.5	7.0	0.0	13.1	0.3	0.0	0.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	2	1268	1077	172	0	1358	103	0	209	7	0	123
V/C Ratio(X)	0.52	1.59	0.18	1.47	0.00	1.27	1.73	0.00	0.85	0.54	0.00	0.03
Avail Cap(c_a), veh/h	59	1268	1077	172	0	1358	103	0	356	59	0	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	59.9	19.2	7.0	57.0	0.0	16.2	56.5	0.0	50.9	59.6	0.0	51.2
Incr Delay (d2), s/veh	132.8	268.4	0.4	240.4	0.0	126.4	365.4	0.0	9.1	50.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.1	136.1	2.5	8.6	0.0	91.8	13.9	0.0	6.3	0.2	0.0	0.1
LnGrp Delay(d),s/veh	192.7	287.6	7.4	297.4	0.0	142.7	421.9	0.0	60.0	109.8	0.0	51.3
LnGrp LOS	F	F	A	F		F	F		E	F		D
Approach Vol, veh/h		2209			1974			356				8
Approach Delay, s/veh		262.8			162.5			242.0				80.5
Approach LOS		F			F			F				F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.5	19.8	10.0	85.7	11.0	13.3	4.1	91.5				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	27.0	6.0	67.0	7.0	24.0	4.0	69.0				
Max Q Clear Time (g_c+I1), s	2.3	15.1	8.0	83.7	9.0	2.3	2.1	89.5				
Green Ext Time (p_c), s	0.0	0.8	0.0	0.0	0.0	1.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			217.3									
HCM 2010 LOS			F									

HIGHWAY 68 AT CORRAL DE TIERRA

Sidra Outputs

LANE SUMMARY

 Site: 2015 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Corral de Tierra													
Lane 1	158	2.0	444	0.355	100	14.3	LOS B	1.6	40.3	Full	1600	0.0	0.0
Lane 2 ^d	314	5.0	491	0.640	100	22.7	LOS C	3.6	93.8	Full	1600	0.0	0.0
Approach	472	4.0		0.640		19.9	LOS C	3.6	93.8				
East: SR 68													
Lane 1 ^d	895	3.0	1188	0.753	100	15.4	LOS C	9.0	229.5	Full	1600	0.0	0.0
Lane 2	861	2.1	1198	0.719	95 ⁶	13.9	LOS B	7.7	195.5	Short	500	0.0	0.0
Approach	1757	2.5		0.753		14.6	LOS B	9.0	229.5				
North: Corral de Tierra													
Lane 1 ^d	15	3.7	275	0.055	100	14.2	LOS B	0.2	4.6	Full	1600	0.0	0.0
Approach	15	3.7		0.055		14.2	LOS B	0.2	4.6				
West: SR 68													
Lane 1 ^d	678	2.0	1164	0.583	100	10.2	LOS B	4.5	114.3	Full	1600	0.0	0.0
Lane 2	647	2.0	1164	0.556	95 ⁶	9.7	LOS A	4.1	104.7	Short	500	0.0	0.0
Approach	1325	2.0		0.583		10.0	LOS A	4.5	114.3				
Intersection	3568	2.5		0.753		13.6	LOS B	9.0	229.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

Processed: Thursday, October 15, 2015 11:22:23 AM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCO_03_Highway 68 at Corral de Tierra

Alternative 1 CDT vols.sip6

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SIDRA
INTERSECTION 6

LANE SUMMARY

 Site: 2015 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Corral de Tierra													
Lane 1	125	2.0	356	0.351	100	17.2	LOS C	1.5	37.4	Full	1600	0.0	0.0
Lane 2 ^d	163	2.0	414	0.394	100	16.2	LOS C	1.7	42.1	Full	1600	0.0	0.0
Approach	288	2.0		0.394		16.6	LOS C	1.7	42.1				
East: SR 68													
Lane 1 ^d	767	2.0	1241	0.618	100	10.6	LOS B	5.5	138.7	Full	1600	0.0	0.0
Lane 2	732	2.0	1241	0.589	95 ⁶	9.9	LOS A	4.9	125.6	Short	500	0.0	0.0
Approach	1499	2.0		0.618		10.2	LOS B	5.5	138.7				
North: Corral de Tierra													
Lane 1 ^d	10	2.0	365	0.027	100	10.3	LOS B	0.1	2.3	Full	1600	0.0	0.0
Approach	10	2.0		0.027		10.3	LOS B	0.1	2.3				
West: SR 68													
Lane 1 ^d	836	2.0	1075	0.778	100	17.9	LOS C	10.4	264.9	Full	1600	0.0	0.0
Lane 2	798	2.0	1075	0.742	95 ⁶	16.0	LOS C	8.9	225.7	Short	500	0.0	0.0
Approach	1634	2.0		0.778		17.0	LOS C	10.4	264.9				
Intersection	3430	2.0		0.778		14.0	LOS B	10.4	264.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

Processed: Thursday, October 15, 2015 11:20:22 AM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCO_03_Highway 68 at Corral de Tierra

Alternative 1 CDT vols.sip6

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2025 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Corral de Tierra													
Lane 1	171	2.0	340	0.502	100	23.3	LOS C	2.4	59.7	Full	1600	0.0	0.0
Lane 2 ^d	333	4.0	390	0.854	100	48.7	LOS E	6.4	164.2	Full	1600	0.0	0.0
Approach	503	3.3		0.854		40.1	LOS E	6.4	164.2				
East: SR 68													
Lane 1 ^d	1076	5.3	1147	0.939	100	33.0	LOS D	25.2	655.7	Full	1600	0.0	0.0
Lane 2	1020	5.9	1140	0.895	95 ⁶	26.8	LOS D	18.4	483.0	Short	500	0.0	4.0
Approach	2097	5.6		0.939		30.0	LOS D	25.2	655.7				
North: Corral de Tierra													
Lane 1 ^d	15	3.1	188	0.081	100	21.2	LOS C	0.2	6.4	Full	1600	0.0	0.0
Approach	15	3.1		0.081		21.2	LOS C	0.2	6.4				
West: SR 68													
Lane 1 ^d	818	2.0	1151	0.711	100	14.0	LOS B	7.8	197.3	Full	1600	0.0	0.0
Lane 2	781	2.0	1151	0.678	95 ⁶	12.8	LOS B	6.7	169.7	Short	500	0.0	0.0
Approach	1599	2.0		0.711		13.4	LOS B	7.8	197.3				
Intersection	4214	4.0		0.939		24.9	LOS C	25.2	655.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

Processed: Thursday, October 15, 2015 11:23:08 AM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCO_03_Highway 68 at Corral de Tierra

Alternative 1 CDT vols.sip6

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SIDRA
INTERSECTION 6

LANE SUMMARY

 Site: 2025 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Corral de Tierra													
Lane 1 ^d	180	2.0	263	0.686	100	42.5	LOS E	3.2	81.9	Full	1600	0.0	0.0
Lane 2	177	2.0	215	0.824	100	69.4	LOS F	4.7	120.0	Full	1600	0.0	0.0
Approach	358	2.0		0.824		55.8	LOS F	4.7	120.0				
East: SR 68													
Lane 1 ^d	1010	2.0	1173	0.861	100	22.7	LOS C	16.6	421.9	Full	1600	0.0	0.0
Lane 2	964	2.0	1173	0.821	95 ⁶	19.4	LOS C	13.3	337.7	Short	500	0.0	0.0
Approach	1974	2.0		0.861		21.1	LOS C	16.6	421.9				
North: Corral de Tierra													
Lane 1 ^d	10	2.0	224	0.044	100	17.0	LOS C	0.1	3.5	Full	1600	0.0	0.0
Approach	10	2.0		0.044		17.0	LOS C	0.1	3.5				
West: SR 68													
Lane 1 ^d	1130	2.0	1084	1.043	100	58.5	LOS F	49.2	1248.7	Full	1600	0.0	0.0
Lane 2	1078	2.0	1084	0.994	95 ⁶	45.6	LOS E	36.5	927.4	Short	500	0.0	28.2
Approach	2209	2.0		1.043		52.2	LOS F	49.2	1248.7				
Intersection	4550	2.0		1.043		38.9	LOS E	49.2	1248.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects

^d Dominant lane on roundabout approach

Regional Intersection Control Evaluation
Section 6:

City of Monterey

Appendix B6: Analysis Worksheets

Study Intersections:

- PEARL STREET AT CAMINO EL ESTERO
- DEL MONTE BOULEVARD AT ENGLISH AVENUE
- MUNRAS AVENUE / ARBREGO STREET AT EL DORADO STREET
- EAST FRANKLIN STREET AT CAMINO EL ESTERO



PEARL STREET AT CAMINO EL ESTERO

Capital Cost Worksheet

City of Monterey **Capital Cost Worksheet**

MCY_01 Pearl Street at Camino El Estero

Capital Cost				Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
B/C Target	SIGNAL (a)	ROUNDBABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 653,800	\$ 903,775	\$ 249,975	\$ (123,736)	\$ 729,338	\$ 126,239	5.78
High	\$ 719,180	\$ 813,398	\$ 94,218			\$ (29,519)	(24.71)
Low	\$ 588,420	\$ 994,153	\$ 405,733			\$ 281,997	2.59
Breakeven	\$ 653,800	\$ 1,506,874	\$ 853,074			\$ 729,338	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDBABOUT
\$ -	\$ 600,000
\$ -	\$ 800,000
\$ -	\$ 1,000,000
\$ -	\$ 1,200,000
\$ 546,926	\$ 1,400,000
\$ 746,926	\$ 1,600,000
\$ 946,926	\$ 1,800,000
\$ 1,146,926	\$ 2,000,000
\$ 1,346,926	\$ 2,200,000
\$ 1,546,926	\$ 2,400,000

Cost Sensitivity Assumptions

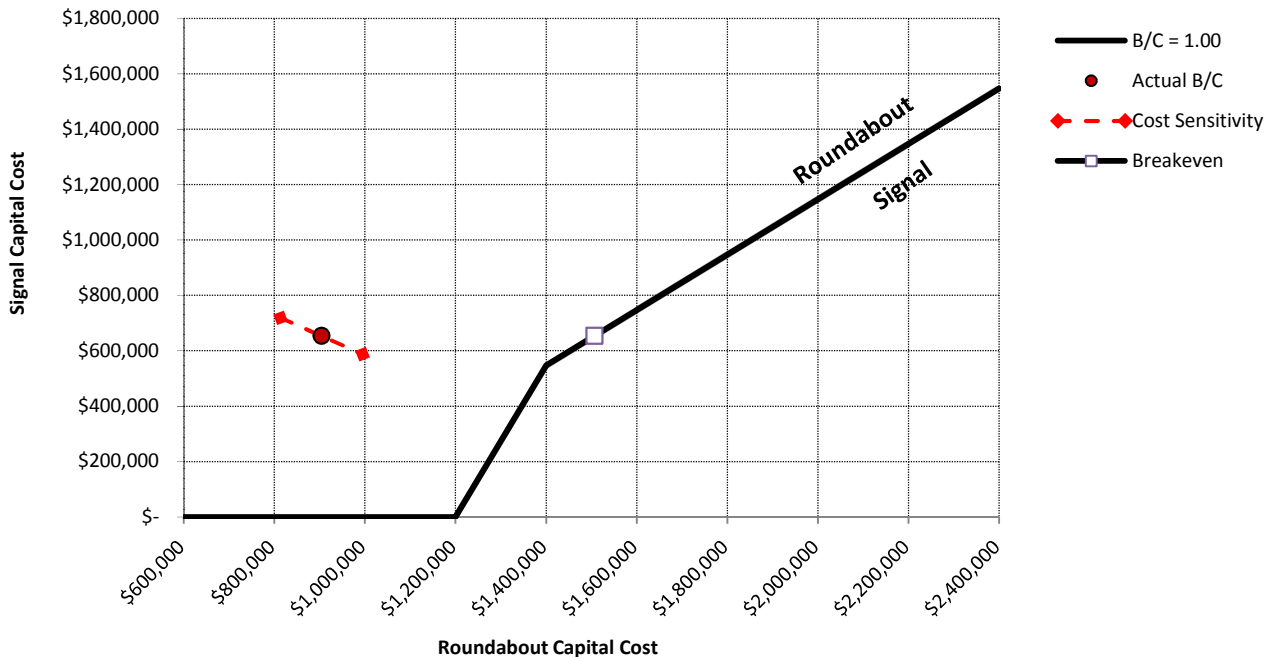
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	67%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 200,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



PEARL STREET AT CAMINO EL ESTERO

Turning Movement Volumes

EXISTING												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	99	151	29	17	112	14	196	316	14	4	159	17
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

Source: City of Monterey, October 2, 2015

CUMULATIVE												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	104	159	30	18	118	15	206	332	15	4	167	18
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

Source: Kittelson & Associates, Inc.(5% total growth)

PEARL STREET AT CAMINO EL ESTERO

Synchro Outputs

Intersection												
Intersection Delay, s/veh	15.2											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	4	159	17	0	17	112	14	0	99	151	29
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	0	4	173	18	0	18	122	15	0	108	164	32
Number of Lanes	0	0	1	1	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	13.9	13.8	12.8
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	2%	0%	12%	100%	0%
Vol Thru, %	0%	84%	98%	0%	78%	0%	96%
Vol Right, %	0%	16%	0%	100%	10%	0%	4%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	180	163	17	143	196	330
LT Vol	99	0	4	0	17	196	0
Through Vol	0	151	159	0	112	0	316
RT Vol	0	29	0	17	14	0	14
Lane Flow Rate	108	196	177	18	155	213	359
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.219	0.364	0.363	0.034	0.319	0.404	0.626
Departure Headway (Hd)	7.321	6.694	7.379	6.65	7.391	6.938	6.399
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	492	540	489	540	488	522	567
Service Time	5.04	4.414	5.096	4.368	5.413	4.638	4.099
HCM Lane V/C Ratio	0.22	0.363	0.362	0.033	0.318	0.408	0.633
HCM Control Delay	12.1	13.2	14.3	9.6	13.8	14.3	19.2
HCM Lane LOS	B	B	B	A	B	B	C
HCM 95th-tile Q	0.8	1.7	1.6	0.1	1.4	1.9	4.3

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	196	316	14
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	213	343	15
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	17.4
HCM LOS	C

Lane

Queues

1: Camino El Estero & Pearl Street






















Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	177	18	155	108	196	213	358
v/c Ratio	0.47	0.04	0.44	0.50	0.22	0.59	0.34
Control Delay	22.9	0.2	21.5	33.1	12.9	26.4	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	0.2	21.5	33.1	12.9	26.4	10.9
Queue Length 50th (ft)	49	0	40	32	38	59	68
Queue Length 95th (ft)	96	0	83	#92	89	123	141
Internal Link Dist (ft)	181		129		148		206
Turn Bay Length (ft)		55		165		230	
Base Capacity (vph)	685	663	643	218	880	437	1039
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.03	0.24	0.50	0.22	0.49	0.34

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Camino El Estero & Pearl Street

TAMC Regional ICE - Monterey City
 Proposed PM (2015)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	159	17	17	112	14	99	151	29	196	316	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		1.00	0.95		0.93	1.00		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	4	173	0	18	122	15	108	164	32	213	343	15
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	412	354	99	334	38	138	592	116	268	824	36
Arrive On Green	0.22	0.22	0.00	0.22	0.22	0.22	0.08	0.39	0.39	0.15	0.47	0.47
Sat Flow, veh/h	12	1844	1583	95	1494	170	1774	1510	295	1774	1770	77
Grp Volume(v), veh/h	177	0	0	155	0	0	108	0	196	213	0	358
Grp Sat Flow(s),veh/h/ln	1856	0	1583	1759	0	0	1774	0	1804	1774	0	1848
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	3.8	6.0	0.0	6.6
Cycle Q Clear(g_c), s	4.2	0.0	0.0	3.7	0.0	0.0	3.1	0.0	3.8	6.0	0.0	6.6
Prop In Lane	0.02		1.00	0.12		0.10	1.00		0.16	1.00		0.04
Lane Grp Cap(c), veh/h	486	0	354	471	0	0	138	0	708	268	0	860
V/C Ratio(X)	0.36	0.00	0.00	0.33	0.00	0.00	0.78	0.00	0.28	0.79	0.00	0.42
Avail Cap(c_a), veh/h	718	0	553	684	0	0	207	0	708	413	0	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.2	0.0	0.0	17.0	0.0	0.0	23.3	0.0	10.7	21.1	0.0	9.1
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.0	0.0	10.6	0.0	1.0	5.8	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	0.0	1.9	0.0	0.0	1.9	0.0	2.1	3.3	0.0	3.6
LnGrp Delay(d),s/veh	17.6	0.0	0.0	17.4	0.0	0.0	33.9	0.0	11.7	26.9	0.0	10.6
LnGrp LOS	B			B			C		B	C		B
Approach Vol, veh/h		177			155			304			571	
Approach Delay, s/veh		17.6			17.4			19.6			16.7	
Approach LOS		B			B			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.8	24.2		15.5	8.0	28.0		15.5				
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0				
Max Green Setting (Gmax), s	12.0	18.0		18.0	6.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	8.0	5.8		6.2	5.1	8.6		5.7				
Green Ext Time (p_c), s	0.2	2.7		1.5	0.0	3.0		1.6				
Intersection Summary												
HCM 2010 Ctrl Delay			17.6									
HCM 2010 LOS			B									

Intersection												
Intersection Delay, s/veh	16.6											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	5	167	18	0	18	118	15	0	104	159	31
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	0	5	182	20	0	20	128	16	0	113	173	34
Number of Lanes	0	0	1	1	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	14.6	14.6	13.5
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	3%	0%	12%	100%	0%
Vol Thru, %	0%	84%	97%	0%	78%	0%	96%
Vol Right, %	0%	16%	0%	100%	10%	0%	4%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	104	190	172	18	151	206	347
LT Vol	104	0	5	0	18	206	0
Through Vol	0	159	167	0	118	0	332
RT Vol	0	31	0	18	15	0	15
Lane Flow Rate	113	207	187	20	164	224	377
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.236	0.395	0.393	0.037	0.346	0.44	0.674
Departure Headway (Hd)	7.506	6.877	7.563	6.831	7.583	7.07	6.565
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	479	525	477	525	476	511	554
Service Time	5.238	4.609	5.292	4.56	5.615	4.806	4.265
HCM Lane V/C Ratio	0.236	0.394	0.392	0.038	0.345	0.438	0.681
HCM Control Delay	12.6	14	15.1	9.8	14.6	15.3	21.8
HCM Lane LOS	B	B	C	A	B	C	C
HCM 95th-tile Q	0.9	1.9	1.8	0.1	1.5	2.2	5.1

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	206	332	15
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	224	361	16
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	19.4
HCM LOS	C

Lane

Queues

1: Camino El Estero & Pearl Street




















	→	↘	←	↙	↑	↘	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	187	20	164	113	207	224	377
v/c Ratio	0.47	0.05	0.45	0.39	0.24	0.58	0.39
Control Delay	22.5	0.2	21.3	25.0	13.3	26.0	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	0.2	21.3	25.0	13.3	26.0	13.4
Queue Length 50th (ft)	52	0	43	32	42	61	82
Queue Length 95th (ft)	100	0	87	76	96	#132	169
Internal Link Dist (ft)	181		129		148		206
Turn Bay Length (ft)		55		165		230	
Base Capacity (vph)	716	638	667	343	862	458	960
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.03	0.25	0.33	0.24	0.49	0.39

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: Camino El Estero & Pearl Street

TAMC Regional ICE - Monterey City
 Proposed PM (2040)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	167	18	18	118	15	104	159	31	206	332	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.94		1.00	0.95		0.92	1.00		0.97	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	182	0	20	128	16	113	173	34	224	361	16
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	451	388	105	363	42	146	539	106	281	768	34
Arrive On Green	0.25	0.25	0.00	0.25	0.25	0.25	0.08	0.36	0.36	0.16	0.43	0.43
Sat Flow, veh/h	14	1840	1583	99	1481	171	1774	1506	296	1774	1769	78
Grp Volume(v), veh/h	187	0	0	164	0	0	113	0	207	224	0	377
Grp Sat Flow(s),veh/h/ln	1854	0	1583	1750	0	0	1774	0	1802	1774	0	1847
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	4.2	6.1	0.0	7.3
Cycle Q Clear(g_c), s	4.2	0.0	0.0	3.8	0.0	0.0	3.1	0.0	4.2	6.1	0.0	7.3
Prop In Lane	0.03		1.00	0.12		0.10	1.00		0.16	1.00		0.04
Lane Grp Cap(c), veh/h	528	0	388	509	0	0	146	0	645	281	0	802
V/C Ratio(X)	0.35	0.00	0.00	0.32	0.00	0.00	0.77	0.00	0.32	0.80	0.00	0.47
Avail Cap(c_a), veh/h	735	0	567	699	0	0	317	0	645	423	0	802
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	0.0	15.8	0.0	0.0	22.6	0.0	11.7	20.4	0.0	10.1
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.4	0.0	0.0	8.4	0.0	1.3	6.1	0.0	2.0
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	2.2	0.0	0.0	1.9	0.0	0.0	1.9	0.0	2.3	3.5	0.0	4.1
LnGrp Delay(d),s/veh	16.3	0.0	0.0	16.1	0.0	0.0	31.0	0.0	13.0	26.5	0.0	12.1
LnGrp LOS	B			B			C		B	C		B
Approach Vol, veh/h		187			164			320			601	
Approach Delay, s/veh		16.3			16.1			19.4			17.5	
Approach LOS		B			B			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	22.0		16.3	8.1	25.8		16.3				
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0				
Max Green Setting (Gmax), s	12.0	18.0		18.0	9.0	21.0		18.0				
Max Q Clear Time (g_c+I1), s	8.1	6.2		6.2	5.1	9.3		5.8				
Green Ext Time (p_c), s	0.2	2.8		1.6	0.1	2.8		1.7				
Intersection Summary												
HCM 2010 Ctrl Delay				17.6								
HCM 2010 LOS				B								

PEARL STREET AT CAMINO EL ESTERO

Sidra Outputs

LANE SUMMARY

 Site: 2015 Proposed PM - Final

Pearl Street at Camino El Estero
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Camino El Estero													
Lane 1 ^d	303	2.0	964	0.314	100	7.0	LOS A	1.6	40.0	Full	350	0.0	0.0
Approach	303	2.0		0.314		7.0	LOS A	1.6	40.0				
East: Pearl Street													
Lane 1 ^d	155	2.0	1076	0.144	100	4.6	LOS A	0.7	16.7	Full	1600	0.0	0.0
Approach	155	2.0		0.144		4.6	LOS A	0.7	16.7				
North: Camino El Estero													
Lane 1 ^d	572	2.0	1103	0.518	100	9.3	LOS A	3.5	88.7	Full	380	0.0	0.0
Approach	572	2.0		0.518		9.3	LOS A	3.5	88.7				
West: Pearl Street													
Lane 1 ^d	196	2.0	805	0.243	100	7.1	LOS A	1.1	27.2	Full	660	0.0	0.0
Approach	196	2.0		0.243		7.1	LOS A	1.1	27.2				
Intersection	1226	2.0		0.518		7.8	LOS A	3.5	88.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

Pearl Street at Camino El Estero
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Camino El Estero													
Lane 1 ^d	320	2.0	944	0.338	100	7.4	LOS A	1.7	43.6	Full	350	0.0	0.0
Approach	320	2.0		0.338		7.4	LOS A	1.7	43.6				
East: Pearl Street													
Lane 1 ^d	164	2.0	1059	0.155	100	4.8	LOS A	0.7	18.0	Full	1600	0.0	0.0
Approach	164	2.0		0.155		4.8	LOS A	0.7	18.0				
North: Camino El Estero													
Lane 1 ^d	601	2.0	1089	0.552	100	10.1	LOS B	4.0	101.1	Full	380	0.0	0.0
Approach	601	2.0		0.552		10.1	LOS B	4.0	101.1				
West: Pearl Street													
Lane 1 ^d	207	2.0	781	0.264	100	7.6	LOS A	1.2	29.7	Full	660	0.0	0.0
Approach	207	2.0		0.264		7.6	LOS A	1.2	29.7				
Intersection	1291	2.0		0.552		8.3	LOS A	4.0	101.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

DEL MONTE BOULEVARD AT ENGLISH AVENUE

Capital Cost Worksheet

City of Monterey **Capital Cost Worksheet**

MCY_02 Del Monte Boulevard at English Avenue

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAOBT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 370,000	\$ 5,024,125	\$ 4,654,125	\$ (118,090)	\$ 7,049,198	\$ 4,536,035	1.55
High	\$ 407,000	\$ 4,521,713	\$ 4,114,713			\$ 3,996,623	1.76
Low	\$ 333,000	\$ 5,526,538	\$ 5,193,538			\$ 5,075,448	1.39
Breakeven	\$ 370,000	\$ 7,537,288	\$ 7,167,288			\$ 7,049,198	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAOBT
\$ -	\$ 3,000,000
\$ -	\$ 4,000,000
\$ -	\$ 5,000,000
\$ -	\$ 6,000,000
\$ -	\$ 7,000,000
\$ 832,712	\$ 8,000,000
\$ 1,832,712	\$ 9,000,000
\$ 2,832,712	\$ 10,000,000
\$ 3,832,712	\$ 11,000,000
\$ 4,832,712	\$ 12,000,000

Cost Sensitivity Assumptions

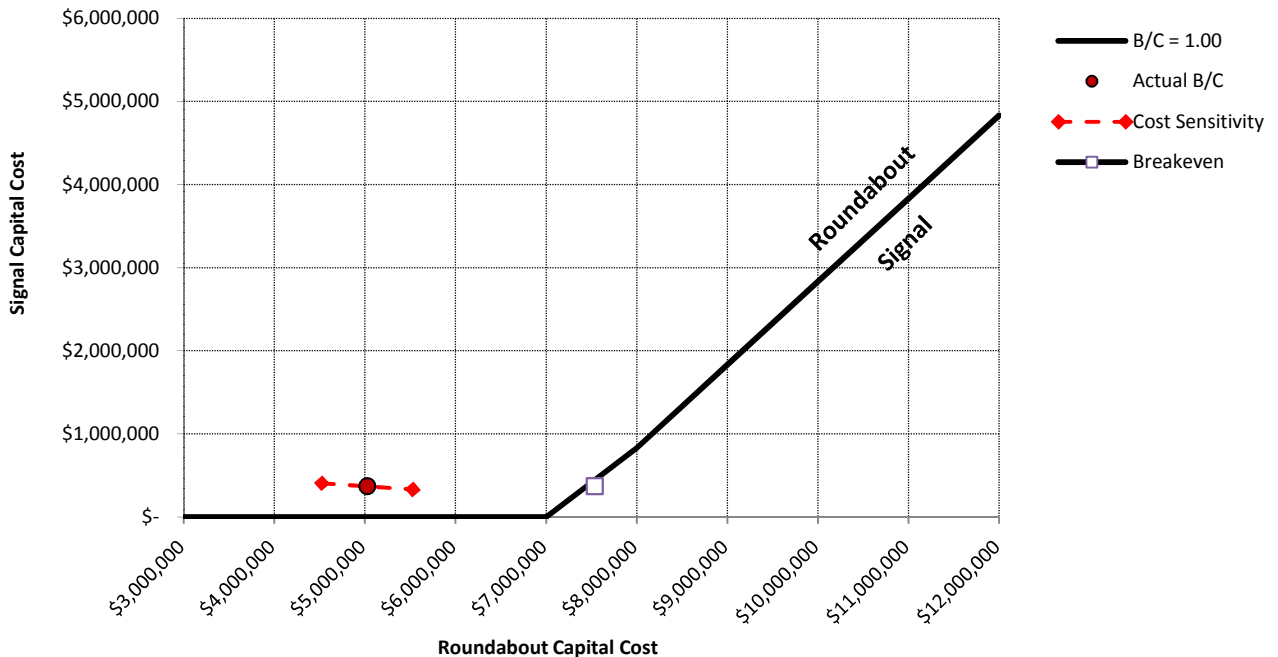
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	50%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 1,000,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



DEL MONTE BOULEVARD AT ENGLISH AVENUE

Turning Movement Volumes

EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	128	0	242	40	1840	0	0	0	0	0	992	569
PHF	0.92	0	0.92	0.92	0.92	0	0	0	0	0	0.92	0.92
Truck %	2%	0%	2%	2%	2%	0%	0%	0%	0%	0%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	101	0	595	108	1271	0	0	0	0	0	2409	1452
PHF	0.92	0	0.92	0.92	0.92	0	0	0	0	0	0.92	0.92
Truck %	2%	0%	2%	2%	2%	0%	0%	0%	0%	0%	2%	2%
Pedestrians												
Bicycles												
<i>Source: City of Monterey, June 12, 2007</i>												

CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	178	0	336	56	2555	0	0	0	0	0	1378	790
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	140	0	826	150	1765	0	0	0	0	0	3345	2016
PHF	0.92	0	0.92	0.92	0.92	0	0	0	0	0	0.92	0.92
Truck %	2%	0%	2%	2%	2%	0%	0%	0%	0%	0%	2%	2%
Pedestrians												
Bicycles												
<i>Source: Kittelson & Associates, Inc.(1% growth rate)</i>												

DEL MONTE BOULEVARD AT ENGLISH AVENUE

Synchro Outputs

Queues
1: English Ave & Del Monte Ave

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1078	618	43	2000	139	263
v/c Ratio	0.94	0.39	0.11	0.95	0.24	0.38
Control Delay	51.8	0.7	33.6	32.8	28.2	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	0.7	33.6	32.8	28.2	5.0
Queue Length 50th (ft)	379	0	24	639	70	0
Queue Length 95th (ft)	#515	0	54	#862	121	56
Internal Link Dist (ft)	312			241	276	
Turn Bay Length (ft)			140			110
Base Capacity (vph)	1146	1583	409	2097	573	690
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	0.94	0.39	0.11	0.95	0.24	0.38

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: English Ave & Del Monte Ave

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓		
Volume (veh/h)	992	569	40	1840	128	242		
Number	2	12	1	6	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1078	0	43	2000	139	263		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1147	513	411	2097	575	513		
Arrive On Green	0.32	0.00	0.23	0.59	0.32	0.32		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	1078	0	43	2000	139	263		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	32.0	0.0	2.1	57.2	6.2	14.5		
Cycle Q Clear(g_c), s	32.0	0.0	2.1	57.2	6.2	14.5		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1147	513	411	2097	575	513		
V/C Ratio(X)	0.94	0.00	0.10	0.95	0.24	0.51		
Avail Cap(c_a), veh/h	1147	513	411	2097	575	513		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	35.5	0.0	32.7	20.6	26.8	29.6		
Incr Delay (d2), s/veh	15.6	0.0	0.5	11.4	1.0	3.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	18.1	0.0	1.1	30.8	3.2	6.9		
LnGrp Delay(d),s/veh	51.0	0.0	33.2	32.0	27.8	33.2		
LnGrp LOS	D		C	C	C	C		
Approach Vol, veh/h	1078			2043	402			
Approach Delay, s/veh	51.0			32.0	31.3			
Approach LOS	D			C	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	29.0	40.0		39.0		69.0		
Change Period (Y+Rc), s	4.0	5.0		4.0		5.0		
Max Green Setting (Gmax), s	25.0	35.0		35.0		35.0		
Max Q Clear Time (g_c+I1), s	4.1	34.0		16.5		59.2		
Green Ext Time (p_c), s	0.0	1.0		0.7		0.0		
Intersection Summary								
HCM 2010 Ctrl Delay			37.8					
HCM 2010 LOS			D					

Queues
1: English Ave & Del Monte Ave

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	2618	1578	117	1382	110	647
v/c Ratio	2.28	1.00	0.29	0.66	0.19	0.68
Control Delay	602.5	25.0	36.4	16.6	27.5	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	602.5	25.0	36.4	16.6	27.5	6.4
Queue Length 50th (ft)	~1555	0	67	314	55	0
Queue Length 95th (ft)	#1688	#256	119	388	99	90
Internal Link Dist (ft)	312			241	276	
Turn Bay Length (ft)			140			110
Base Capacity (vph)	1146	1583	409	2097	573	950
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	2.28	1.00	0.29	0.66	0.19	0.68

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: English Ave & Del Monte Ave

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓		
Volume (veh/h)	2409	1452	108	1271	101	595		
Number	2	12	1	6	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	2618	0	117	1382	110	647		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1147	513	411	2097	575	513		
Arrive On Green	0.32	0.00	0.23	0.59	0.32	0.32		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	2618	0	117	1382	110	647		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	35.0	0.0	5.9	28.2	4.8	35.0		
Cycle Q Clear(g_c), s	35.0	0.0	5.9	28.2	4.8	35.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1147	513	411	2097	575	513		
V/C Ratio(X)	2.28	0.00	0.28	0.66	0.19	1.26		
Avail Cap(c_a), veh/h	1147	513	411	2097	575	513		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	36.5	0.0	34.1	14.7	26.3	36.5		
Incr Delay (d2), s/veh	579.9	0.0	1.7	1.6	0.7	132.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	109.4	0.0	3.1	14.1	2.5	34.1		
LnGrp Delay(d),s/veh	616.4	0.0	35.9	16.3	27.0	168.9		
LnGrp LOS	F		D	B	C	F		
Approach Vol, veh/h	2618			1499	757			
Approach Delay, s/veh	616.4			17.9	148.3			
Approach LOS	F			B	F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	29.0	40.0		39.0		69.0		
Change Period (Y+Rc), s	4.0	5.0		4.0		5.0		
Max Green Setting (Gmax), s	25.0	35.0		35.0		35.0		
Max Q Clear Time (g_c+I1), s	7.9	37.0		37.0		30.2		
Green Ext Time (p_c), s	0.1	0.0		0.0		4.8		
Intersection Summary								
HCM 2010 Ctrl Delay			359.6					
HCM 2010 LOS			F					

Queues
1: English Ave & Del Monte Ave

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1498	859	61	2777	193	365
v/c Ratio	0.64	0.54	0.48	1.03	0.64	0.31
Control Delay	15.2	1.3	76.0	41.9	64.5	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	1.3	76.0	41.9	64.5	1.5
Queue Length 50th (ft)	389	0	54	~1416	165	0
Queue Length 95th (ft)	457	0	104	#1534	252	33
Internal Link Dist (ft)	312			241	276	
Turn Bay Length (ft)			140			110
Base Capacity (vph)	2350	1583	126	2704	303	1174
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	0.64	0.54	0.48	1.03	0.64	0.31

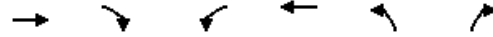
Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: English Ave & Del Monte Ave

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓		
Volume (veh/h)	1378	790	56	2555	178	336		
Number	2	12	1	6	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1498	0	61	2777	193	365		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	2351	1052	127	2705	304	271		
Arrive On Green	0.66	0.00	0.07	0.76	0.17	0.17		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	1498	0	61	2777	193	365		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	34.5	0.0	4.6	107.0	14.2	24.0		
Cycle Q Clear(g_c), s	34.5	0.0	4.6	107.0	14.2	24.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2351	1052	127	2705	304	271		
V/C Ratio(X)	0.64	0.00	0.48	1.03	0.63	1.34		
Avail Cap(c_a), veh/h	2351	1052	127	2705	304	271		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	13.7	0.0	62.5	16.5	53.9	58.0		
Incr Delay (d2), s/veh	1.3	0.0	12.5	24.5	9.7	177.7		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	17.1	0.0	2.7	60.3	7.8	23.9		
LnGrp Delay(d),s/veh	15.0	0.0	75.0	41.0	63.6	235.7		
LnGrp LOS	B		E	F	E	F		
Approach Vol, veh/h	1498			2838	558			
Approach Delay, s/veh	15.0			41.8	176.2			
Approach LOS	B			D	F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.0	98.0		28.0		112.0		
Change Period (Y+Rc), s	4.0	5.0		4.0		5.0		
Max Green Setting (Gmax), s	10.0	93.0		24.0		107.0		
Max Q Clear Time (g_c+I1), s	6.6	36.5		26.0		109.0		
Green Ext Time (p_c), s	0.0	56.3		0.0		0.0		
Intersection Summary								
HCM 2010 Ctrl Delay			48.9					
HCM 2010 LOS			D					

Queues
1: English Ave & Del Monte Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	3636	2191	163	1918	152	898
v/c Ratio	1.48	1.38	1.54	0.69	0.54	0.65
Control Delay	242.9	188.9	326.6	9.6	65.7	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	242.9	188.9	326.6	9.6	65.7	3.0
Queue Length 50th (ft)	~2572	~1233	~223	413	139	0
Queue Length 95th (ft)	#2651	#1477	#377	478	216	38
Internal Link Dist (ft)	312			241	276	
Turn Bay Length (ft)			140			110
Base Capacity (vph)	2453	1583	106	2760	283	1372
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	1.48	1.38	1.54	0.69	0.54	0.65

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 1: English Ave & Del Monte Ave

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑		
Volume (veh/h)	3345	2016	150	1765	140	826		
Number	2	12	1	6	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	3636	0	163	1918	152	898		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	2454	1098	106	2761	284	253		
Arrive On Green	0.69	0.00	0.06	0.78	0.16	0.16		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	3636	0	163	1918	152	898		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	104.0	0.0	9.0	39.0	11.8	24.0		
Cycle Q Clear(g_c), s	104.0	0.0	9.0	39.0	11.8	24.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2454	1098	106	2761	284	253		
V/C Ratio(X)	1.48	0.00	1.53	0.69	0.54	3.54		
Avail Cap(c_a), veh/h	2454	1098	106	2761	284	253		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	23.0	0.0	70.5	7.9	57.9	63.0		
Incr Delay (d2), s/veh	219.0	0.0	280.6	1.5	7.1	1154.9		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	124.7	0.0	12.7	19.2	6.3	91.8		
LnGrp Delay(d),s/veh	242.0	0.0	351.1	9.4	65.0	1217.9		
LnGrp LOS	F		F	A	E	F		
Approach Vol, veh/h	3636			2081	1050			
Approach Delay, s/veh	242.0			36.2	1051.0			
Approach LOS	F			D	F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	13.0	109.0		28.0		122.0		
Change Period (Y+Rc), s	4.0	5.0		4.0		5.0		
Max Green Setting (Gmax), s	9.0	104.0		24.0		117.0		
Max Q Clear Time (g_c+I1), s	11.0	106.0		26.0		41.0		
Green Ext Time (p_c), s	0.0	0.0		0.0		75.5		
Intersection Summary								
HCM 2010 Ctrl Delay			304.2					
HCM 2010 LOS			F					

DEL MONTE BOULEVARD AT ENGLISH AVENUE

Sidra Outputs

LANE SUMMARY

 Site: 2007 Proposed AM - Final

MCY02
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: English Avenue													
Lane 1 ^d	402	2.0	609	0.660	100	19.9	LOS C	4.4	111.7	Full	1600	0.0	0.0
Approach	402	2.0		0.660		19.9	LOS C	4.4	111.7				
East: Del Monte Avenue													
Lane 1	1022	2.0	1239	0.825	100	18.9	LOS C	13.4	340.8	Full	1600	0.0	0.0
Lane 2 ^d	1022	2.0	1239	0.825	100	18.9	LOS C	13.4	340.8	Full	1600	0.0	0.0
Approach	2043	2.0		0.825		18.9	LOS C	13.4	340.8				
West: Del Monte Avenue													
Lane 1	539	2.0	1364	0.395	100	6.3	LOS A	2.7	67.8	Full	1600	0.0	0.0
Lane 2 ^d	539	2.0	1364	0.395	100	6.3	LOS A	2.7	67.8	Full	1600	0.0	0.0
Lane 3	618	2.0	1579	0.392	100	0.1	LOS A	0.0	0.0	Short	100	0.0	0.0
Approach	1697	2.0		0.395		4.0	LOS A	2.7	67.8				
Intersection	4142	2.0		0.825		12.9	LOS B	13.4	340.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Friday, October 23, 2015 2:46:04 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCY_02_Del Monte Ave at English Ave

\MCY02_clean.sip6

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2007 Proposed PM - Final

MCY02
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: English Avenue													
Lane 1 ^d	757	2.0	162	4.657	100	1700.7	LOS F	201.2	5110.1	Full	1000	0.0	100.0
Approach	757	2.0		4.657		1700.7	LOS F	201.2	5110.1				
East: Del Monte Avenue													
Lane 1	749	2.0	1392	0.538	100	8.3	LOS A	4.8	120.8	Full	1600	0.0	0.0
Lane 2 ^d	749	2.0	1392	0.538	100	8.3	LOS A	4.8	120.8	Full	1600	0.0	0.0
Approach	1499	2.0		0.538		8.3	LOS A	4.8	120.8				
West: Del Monte Avenue													
Lane 1	1309	2.0	1266	1.034	100	52.6	LOS F	65.5	1664.6	Full	1750	0.0	3.5
Lane 2 ^d	1309	2.0	1266	1.034	100	52.6	LOS F	65.5	1664.6	Full	1750	0.0	3.5
Lane 3	1578	2.0	1579	1.000	100	4.7	LOS A	0.0	0.0	Full	1750	0.0	0.0
Approach	4197	2.0		1.034		34.6	LOS D	65.5	1664.6				
Intersection	6452	2.0		4.657		223.8	LOS F	201.2	5110.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Friday, August 14, 2015 9:45:27 AM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCY_02_Del Monte Ave at English Ave

\MCY02_clean.sip6

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INTERSECTION 6

LANE SUMMARY

 Site: 2040 Proposed AM - Final

MCY02
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: English Avenue													
Lane 1 ^d	559	2.0	416	1.343	100	196.4	LOS F	53.5	1359.4	Full	1600	0.0	0.4
Approach	559	2.0		1.343		196.4	LOS F	53.5	1359.4				
East: Del Monte Avenue													
Lane 1	1419	2.0	1233	1.151	100	93.6	LOS F	103.2	2621.3	Full	1600	0.0	22.3
Lane 2 ^d	1419	2.0	1233	1.151	100	93.6	LOS F	103.2	2621.3	Full	1600	0.0	22.3
Approach	2838	2.0		1.151		93.6	LOS F	103.2	2621.3				
West: Del Monte Avenue													
Lane 1	749	2.0	1352	0.554	100	8.7	LOS A	4.9	123.7	Full	1600	0.0	0.0
Lane 2 ^d	749	2.0	1352	0.554	100	8.7	LOS A	4.9	123.7	Full	1600	0.0	0.0
Lane 3	859	2.0	1579	0.544	100	0.1	LOS A	0.0	0.0	Short	100	0.0	0.0
Approach	2357	2.0		0.554		5.6	LOS A	4.9	123.7				
Intersection	5753	2.0		1.343		67.5	LOS F	103.2	2621.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

MCY02
Roundabout

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: English Avenue													
Lane 1 ^d	1050	2.0	180	5.827	100	2221.0	LOS F	291.4	7402.1	Full	1600	0.0	100.0
Approach	1050	2.0		5.827		2221.0	LOS F	291.4	7402.1				
East: Del Monte Avenue													
Lane 1	1041	2.0	1389	0.749	100	13.6	LOS B	11.4	290.8	Full	1600	0.0	0.0
Lane 2 ^d	1041	2.0	1389	0.749	100	13.6	LOS B	11.4	290.8	Full	1600	0.0	0.0
Approach	2082	2.0		0.749		13.6	LOS B	11.4	290.8				
West: Del Monte Avenue													
Lane 1	1818	2.0	1209	1.503	100	243.0	LOS F	237.1	6022.1	Full	1600	0.0	100.0
Lane 2 ^d	1818	2.0	1209	1.503	100	243.0	LOS F	237.1	6022.1	Full	1600	0.0	100.0
Lane 3	2191	2.0	1579	1.388	100	88.2	LOS F	0.0	0.0	Short	100	0.0	0.0
Approach	5827	2.0		1.503		184.8	LOS F	237.1	6022.1				
Intersection	8959	2.0		5.827		383.7	LOS F	291.4	7402.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Thursday, February 11, 2016 3:47:06 PM

SIDRA INTERSECTION 6.0.24.4877

Project: K:\H_Sacramento\profile\17974 - TAMC Regional ICE\1_Project Intersections\MCY_02_Del Monte Ave at English Ave\sidra\MCY02_clean.sip6

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INTERSECTION 6

MUNRAS AVENUE / ARBREGO STREET AT EL DORADO STREET

Capital Cost Worksheet

City of Monterey **Capital Cost Worksheet**

MCY_03 **Munras Avenue / Abrego Street at El Dorado Street**

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 1,250,000	\$ 1,276,155	\$ 26,155	\$ (124,045)	\$ 2,434,252	\$ (97,890)	(24.87)
High	\$ 1,375,000	\$ 1,148,540	\$ (226,461)			\$ (350,506)	(6.94)
Low	\$ 1,125,000	\$ 1,403,771	\$ 278,771			\$ 154,726	15.73
Breakeven	\$ 1,250,000	\$ 3,808,297	\$ 2,558,297			\$ 2,434,252	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAABOUT
\$ -	\$ 500,000
\$ -	\$ 1,000,000
\$ -	\$ 1,500,000
\$ -	\$ 2,000,000
\$ -	\$ 2,500,000
\$ 441,703	\$ 3,000,000
\$ 941,703	\$ 3,500,000
\$ 1,441,703	\$ 4,000,000
\$ 1,941,703	\$ 4,500,000
\$ 2,441,703	\$ 5,000,000

Cost Sensitivity Assumptions

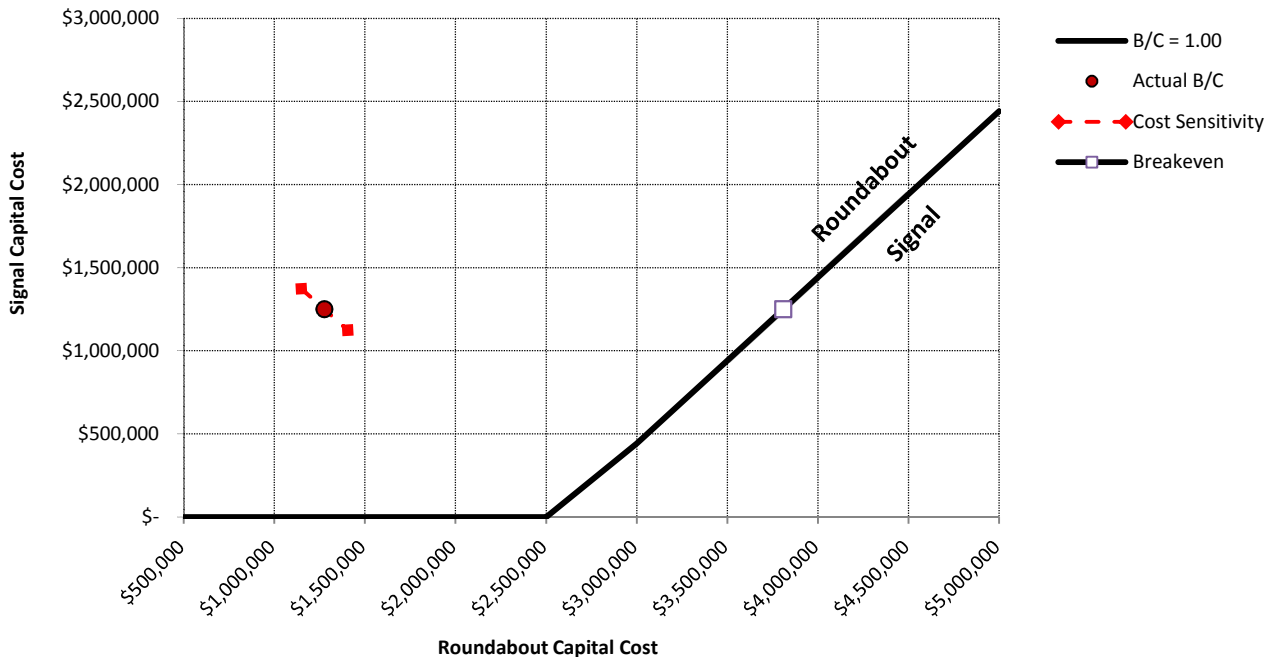
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	198%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase \$ 500,000 (x axis major unit)
 Min Signal Cost \$ 400,000 (Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



MUNRAS AVENUE / ARBREGO STREET AT EL DORADO STREET

Turning Movement Volumes

EXISTING														
AM	NB			WB			SB - Abrego St		SB - Munras Ave			EB		
	↶	↑	↷	↶	↑	↷	↶	↷	↶	↑	↷	↶	↑	↷
EXISTING														
Vehicles	28	237	43	20	90	26	7	59	19	152	147	114	54	4
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	0%	4%	0%	0%	1%	0%	0%	9%	5%	5%	1%	0%	0%	0%
Pedestrians	10	13	0	1	0	6	14	6	13	0	10	6	0	1
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM	NB			WB			SB - Abrego St		SB - Munras Ave			EB		
	↶	↑	↷	↶	↑	↷	↶	↷	↶	↑	↷	↶	↑	↷
EXISTING														
Vehicles	44	443	44	67	58	63	9	108	15	322	61	161	58	60
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	0%	1%	0%	1%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Pedestrians	23	0	1	4	0	17	12	15	7	0	23	17	0	4
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: City of Monterey, January 28, 2015

2040 CUMULATIVE														
AM	NB			WB			SB - Abrego St		SB - Munras Ave			EB		
	↶	↑	↷	↶	↑	↷	↶	↷	↶	↑	↷	↶	↑	↷
2040 CUMULATIVE														
Vehicles	36	304	55	26	115	33	9	75	24	195	189	146	69	5
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	0%	4%	0%	0%	1%	0%	0%	9%	5%	5%	1%	0%	0%	0%
Pedestrians	12	0	17	1	0	7	18	7	17	0	12	7	0	1
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM	NB			WB			SB - Abrego St		SB - Munras Ave			EB		
	↶	↑	↷	↶	↑	↷	↶	↷	↶	↑	↷	↶	↑	↷
2040 CUMULATIVE														
Vehicles	56	568	56	86	74	81	11	139	19	413	79	207	74	77
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	0%	1%	0%	1%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Pedestrians	29	0	1	5	0	21	15	19	9	0	29	21	0	5
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0










Source: Kittelson & Associates, Inc. (1% growth rate)

MUNRAS AVENUE / ARBREGO STREET AT EL DORADO STREET

Synchro Outputs




















Queues

1: Munras Ave & El Dorado St

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SEL
Lane Group Flow (vph)	124	63	22	127	31	305	21	325	71
v/c Ratio	0.36	0.12	0.06	0.24	0.26	0.25	0.18	0.28	0.37
Control Delay	38.0	31.2	32.0	32.5	58.9	26.0	56.9	28.4	54.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	31.2	32.0	32.5	58.9	26.0	56.9	28.4	54.2
Queue Length 50th (ft)	77	34	12	71	23	81	16	93	51
Queue Length 95th (ft)	134	71	34	124	56	116	43	131	99
Internal Link Dist (ft)		264		186		184		254	182
Turn Bay Length (ft)	110		75		105		100		
Base Capacity (vph)	345	534	385	519	120	1225	114	1141	193
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.12	0.06	0.24	0.26	0.25	0.18	0.28	0.37
Intersection Summary									












HCM Signalized Intersection Capacity Analysis
 1: Munras Ave & El Dorado St

TAMC Regional ICE - Monterey City
 Existing AM (2015)

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	7	107	54	4	20	90	8	18	10	18	237	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0				5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00				1.00	0.95	
Frbp, ped/bikes		1.00	1.00		1.00	1.00				1.00	0.99	
Flpb, ped/bikes		0.99	1.00		1.00	1.00				1.00	1.00	
Frt		1.00	0.99		1.00	0.97				1.00	0.98	
Flt Protected		0.95	1.00		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1794	1880		1803	1813				1805	3385	
Flt Permitted		0.65	1.00		0.72	1.00				0.95	1.00	
Satd. Flow (perm)		1218	1880		1359	1813				1805	3385	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	116	59	4	22	98	9	20	11	20	258	47
RTOR Reduction (vph)	0	0	2	0	0	6	0	0	0	0	12	0
Lane Group Flow (vph)	0	124	61	0	22	121	0	0	0	31	293	0
Confl. Peds. (#/hr)	5	1		1	1		5	1	5	5		13
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	4%	0%
Turn Type	Perm	Perm	NA		Perm	NA				Prot	Prot	NA
Protected Phases			3			3				5	5	2
Permitted Phases	3	3			3							
Actuated Green, G (s)		34.0	34.0		34.0	34.0				8.0	43.0	
Effective Green, g (s)		34.0	34.0		34.0	34.0				8.0	43.0	
Actuated g/C Ratio		0.28	0.28		0.28	0.28				0.07	0.36	
Clearance Time (s)		5.0	5.0		5.0	5.0				5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)		345	532		385	513				120	1212	
v/s Ratio Prot			0.03			0.07				c0.02	0.09	
v/s Ratio Perm		c0.10			0.02							
v/c Ratio		0.36	0.11		0.06	0.24				0.26	0.24	
Uniform Delay, d1		34.3	31.8		31.3	33.0				53.2	27.0	
Progression Factor		1.00	1.00		1.00	1.00				1.00	1.00	
Incremental Delay, d2		2.9	0.4		0.3	1.1				5.1	0.5	
Delay (s)		37.2	32.3		31.6	34.1				58.3	27.5	
Level of Service		D	C		C	C				E	C	
Approach Delay (s)			35.6			33.7					30.4	
Approach LOS			D			C					C	
Intersection Summary												
HCM 2000 Control Delay			33.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			70.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												










HCM Signalized Intersection Capacity Analysis
 1: Munras Ave & El Dorado St

TAMC Regional ICE - Monterey City
 Existing AM (2015)

								
Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER	SER2
Lane Configurations								
Volume (vph)	19	152	145	2	3	4	22	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0				5.0		
Lane Util. Factor	1.00	0.95				1.00		
Frbp, ped/bikes	1.00	0.98				0.96		
Flpb, ped/bikes	1.00	1.00				1.00		
Frt	1.00	0.93				0.88		
Flt Protected	0.95	1.00				1.00		
Satd. Flow (prot)	1719	3186				1548		
Flt Permitted	0.95	1.00				1.00		
Satd. Flow (perm)	1719	3186				1548		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	165	158	2	3	4	24	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	325	0	0	0	71	0	0
Confl. Peds. (#/hr)	13		5	5	1	13	1	5
Heavy Vehicles (%)	5%	5%	1%	0%	0%	0%	9%	0%
Turn Type	Prot	NA			Prot	Prot		
Protected Phases	1	6			4	4		
Permitted Phases								
Actuated Green, G (s)	8.0	43.0				15.0		
Effective Green, g (s)	8.0	43.0				15.0		
Actuated g/C Ratio	0.07	0.36				0.12		
Clearance Time (s)	5.0	5.0				5.0		
Vehicle Extension (s)	3.0	3.0				3.0		
Lane Grp Cap (vph)	114	1141				193		
v/s Ratio Prot	0.01	c0.10				c0.05		
v/s Ratio Perm								
v/c Ratio	0.18	0.28				0.37		
Uniform Delay, d1	52.9	27.5				48.2		
Progression Factor	1.00	1.00				1.00		
Incremental Delay, d2	3.5	0.6				5.3		
Delay (s)	56.4	28.1				53.5		
Level of Service	E	C				D		
Approach Delay (s)		29.9				53.5		
Approach LOS		C				D		
Intersection Summary								




















Queues

1: Munras Ave & El Dorado St

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SEL
Lane Group Flow (vph)	175	128	73	131	48	530	16	416	126
v/c Ratio	0.56	0.26	0.23	0.27	0.40	0.43	0.18	0.36	0.49
Control Delay	46.1	24.6	36.8	25.6	64.0	30.5	59.4	31.4	52.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	24.6	36.8	25.6	64.0	30.5	59.4	31.4	52.5
Queue Length 50th (ft)	117	52	44	55	36	161	12	127	90
Queue Length 95th (ft)	195	105	87	109	77	211	36	173	153
Internal Link Dist (ft)		264		186		184		254	182
Turn Bay Length (ft)	110		75		105		100		
Base Capacity (vph)	312	495	318	488	120	1238	90	1153	259
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.26	0.23	0.27	0.40	0.43	0.18	0.36	0.49
Intersection Summary									












HCM Signalized Intersection Capacity Analysis
 1: Munras Ave & El Dorado St

TAMC Regional ICE - Monterey City
 Existing PM (2015)

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	3	158	58	60	67	58	3	60	12	32	443	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0				5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00				1.00	0.95	
Frbp, ped/bikes		1.00	0.99		1.00	0.98				1.00	1.00	
Flpb, ped/bikes		0.98	1.00		1.00	1.00				1.00	1.00	
Frt		1.00	0.92		1.00	0.92				1.00	0.99	
Flt Protected		0.95	1.00		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1757	1740		1780	1722				1805	3522	
Flt Permitted		0.63	1.00		0.64	1.00				0.95	1.00	
Satd. Flow (perm)		1171	1740		1196	1722				1805	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	172	63	65	73	63	3	65	13	35	482	48
RTOR Reduction (vph)	0	0	31	0	0	29	0	0	0	0	7	0
Lane Group Flow (vph)	0	175	97	0	73	102	0	0	0	48	524	0
Confl. Peds. (#/hr)	12	5		4	4		12	5	11	12		1
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%
Turn Type	Perm	Perm	NA		Perm	NA			Prot	Prot	NA	
Protected Phases			3			3			5	5	2	
Permitted Phases	3	3			3							
Actuated Green, G (s)		32.0	32.0		32.0	32.0				8.0	42.0	
Effective Green, g (s)		32.0	32.0		32.0	32.0				8.0	42.0	
Actuated g/C Ratio		0.27	0.27		0.27	0.27				0.07	0.35	
Clearance Time (s)		5.0	5.0		5.0	5.0				5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)		312	464		318	459				120	1232	
v/s Ratio Prot			0.06			0.06				c0.03	c0.15	
v/s Ratio Perm		c0.15			0.06							
v/c Ratio		0.56	0.21		0.23	0.22				0.40	0.42	
Uniform Delay, d1		37.9	34.2		34.4	34.3				53.7	29.8	
Progression Factor		1.00	1.00		1.00	1.00				1.00	1.00	
Incremental Delay, d2		7.1	1.0		1.7	1.1				9.7	1.1	
Delay (s)		45.1	35.2		36.0	35.4				63.4	30.9	
Level of Service		D	D		D	D				E	C	
Approach Delay (s)			40.9			35.6					33.6	
Approach LOS			D			D					C	
Intersection Summary												
HCM 2000 Control Delay			36.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			94.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												










HCM Signalized Intersection Capacity Analysis
 1: Munras Ave & El Dorado St

TAMC Regional ICE - Monterey City
 Existing PM (2015)

								
Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER	SER2
Lane Configurations								
Volume (vph)	15	322	59	2	5	4	81	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0				5.0		
Lane Util. Factor	1.00	0.95				1.00		
Frbp, ped/bikes	1.00	0.99				0.94		
Flpb, ped/bikes	1.00	1.00				1.00		
Frt	1.00	0.98				0.87		
Flt Protected	0.95	1.00				1.00		
Satd. Flow (prot)	1805	3462				1557		
Flt Permitted	0.95	1.00				1.00		
Satd. Flow (perm)	1805	3462				1557		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	350	64	2	5	4	88	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	416	0	0	0	126	0	0
Confl. Peds. (#/hr)	7		11	12	5	7	4	11
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA			Prot	Prot		
Protected Phases	1	6			4	4		
Permitted Phases								
Actuated Green, G (s)	6.0	40.0				20.0		
Effective Green, g (s)	6.0	40.0				20.0		
Actuated g/C Ratio	0.05	0.33				0.17		
Clearance Time (s)	5.0	5.0				5.0		
Vehicle Extension (s)	3.0	3.0				3.0		
Lane Grp Cap (vph)	90	1154				259		
v/s Ratio Prot	0.01	0.12				c0.08		
v/s Ratio Perm								
v/c Ratio	0.18	0.36				0.49		
Uniform Delay, d1	54.6	30.3				45.3		
Progression Factor	1.00	1.00				1.00		
Incremental Delay, d2	4.3	0.9				6.4		
Delay (s)	58.9	31.2				51.7		
Level of Service	E	C				D		
Approach Delay (s)		32.2				51.7		
Approach LOS		C				D		
Intersection Summary								

Queues

1: Munras Ave & El Dorado St




















									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SEL
Lane Group Flow (vph)	159	80	28	161	39	390	26	417	90
v/c Ratio	0.48	0.15	0.07	0.30	0.36	0.33	0.25	0.37	0.59
Control Delay	35.0	26.3	26.5	27.9	54.9	23.3	51.2	25.5	60.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	26.3	26.5	27.9	54.9	23.3	51.2	25.5	60.0
Queue Length 50th (ft)	83	36	13	75	24	88	16	103	56
Queue Length 95th (ft)	148	73	34	130	59	127	43	145	#120
Internal Link Dist (ft)		264		186		184		254	182
Turn Bay Length (ft)	110		75		120		120		
Base Capacity (vph)	334	547	388	532	108	1198	103	1113	152
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.15	0.07	0.30	0.36	0.33	0.25	0.37	0.59

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 1: Munras Ave & El Dorado St














TAMC Regional ICE - Monterey City
 Future AM (2040)

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	9	137	69	5	26	115	10	23	13	23	304	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0				5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00				1.00	0.95	
Frbp, ped/bikes		1.00	1.00		1.00	1.00				1.00	0.99	
Flpb, ped/bikes		0.99	1.00		1.00	1.00				1.00	1.00	
Frt		1.00	0.99		1.00	0.97				1.00	0.98	
Flt Protected		0.95	1.00		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1795	1881		1803	1814				1805	3382	
Flt Permitted		0.61	1.00		0.70	1.00				0.95	1.00	
Satd. Flow (perm)		1153	1881		1338	1814				1805	3382	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	149	75	5	28	125	11	25	14	25	330	60
RTOR Reduction (vph)	0	0	2	0	0	6	0	0	0	0	15	0
Lane Group Flow (vph)	0	159	78	0	28	155	0	0	0	39	375	0
Confl. Peds. (#/hr)	6	1		1	1		6	1	6	6		17
Confl. Bikes (#/hr)												4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	4%	0%
Turn Type	Perm	Perm	NA		Perm	NA			Prot	Prot	NA	
Protected Phases			3			3			5	5	2	
Permitted Phases	3	3			3							
Actuated Green, G (s)		29.0	29.0		29.0	29.0				6.0	35.0	
Effective Green, g (s)		29.0	29.0		29.0	29.0				6.0	35.0	
Actuated g/C Ratio		0.29	0.29		0.29	0.29				0.06	0.35	
Clearance Time (s)		5.0	5.0		5.0	5.0				5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)		334	545		388	526				108	1183	
v/s Ratio Prot			0.04			0.09				c0.02	0.11	
v/s Ratio Perm		c0.14			0.02							
v/c Ratio		0.48	0.14		0.07	0.29				0.36	0.32	
Uniform Delay, d1		29.2	26.3		25.7	27.6				45.2	23.8	
Progression Factor		1.00	1.00		1.00	1.00				1.00	1.00	
Incremental Delay, d2		4.8	0.5		0.4	1.4				9.1	0.7	
Delay (s)		34.0	26.8		26.1	29.0				54.3	24.5	
Level of Service		C	C		C	C				D	C	
Approach Delay (s)			31.6			28.5					27.2	
Approach LOS			C			C					C	
Intersection Summary												
HCM 2000 Control Delay			30.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			84.5%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 1: Munras Ave & El Dorado St

TAMC Regional ICE - Monterey City
 Future AM (2040)

								
Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER	SER2
Lane Configurations		 				 		
Volume (vph)	24	195	186	3	4	5	28	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0				5.0		
Lane Util. Factor	1.00	0.95				1.00		
Frbp, ped/bikes	1.00	0.98				0.95		
Flpb, ped/bikes	1.00	1.00				1.00		
Frt	1.00	0.93				0.88		
Flt Protected	0.95	1.00				1.00		
Satd. Flow (prot)	1719	3182				1528		
Flt Permitted	0.95	1.00				1.00		
Satd. Flow (perm)	1719	3182				1528		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	212	202	3	4	5	30	51
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	26	417	0	0	0	90	0	0
Confl. Peds. (#/hr)	17		6	6	1	17	1	6
Confl. Bikes (#/hr)			3				1	
Heavy Vehicles (%)	5%	5%	1%	0%	0%	0%	9%	0%
Turn Type	Prot	NA			Prot	Prot		
Protected Phases	1	6			4	4		
Permitted Phases								
Actuated Green, G (s)	6.0	35.0				10.0		
Effective Green, g (s)	6.0	35.0				10.0		
Actuated g/C Ratio	0.06	0.35				0.10		
Clearance Time (s)	5.0	5.0				5.0		
Vehicle Extension (s)	3.0	3.0				3.0		
Lane Grp Cap (vph)	103	1113				152		
v/s Ratio Prot	0.02	c0.13				c0.06		
v/s Ratio Perm								
v/c Ratio	0.25	0.37				0.59		
Uniform Delay, d1	44.9	24.3				43.0		
Progression Factor	1.00	1.00				1.00		
Incremental Delay, d2	5.8	1.0				15.8		
Delay (s)	50.7	25.3				58.9		
Level of Service	D	C				E		
Approach Delay (s)		26.8				58.9		
Approach LOS		C				E		
Intersection Summary								

Queues

1: Munras Ave & El Dorado St






















Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SEL
Lane Group Flow (vph)	225	164	93	168	61	678	21	535	163
v/c Ratio	0.70	0.30	0.28	0.31	0.56	0.55	0.19	0.44	1.11
Control Delay	45.1	20.2	30.4	20.9	66.5	27.7	49.2	26.4	149.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	20.2	30.4	20.9	66.5	27.7	49.2	26.4	149.7
Queue Length 50th (ft)	127	54	46	57	39	177	13	136	~119
Queue Length 95th (ft)	#234	108	90	112	#93	235	37	184	#248
Internal Link Dist (ft)		264		186		184		254	182
Turn Bay Length (ft)	110		75		120		120		
Base Capacity (vph)	321	541	329	534	108	1240	108	1211	147
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.30	0.28	0.31	0.56	0.55	0.19	0.44	1.11

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 1: Munras Ave & El Dorado St












TAMC Regional ICE - Monterey City
 Future PM (2040)

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	4	203	74	77	86	74	4	77	15	41	568	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0				5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00				1.00	0.95	
Frbp, ped/bikes		1.00	0.99		1.00	0.98				1.00	1.00	
Flpb, ped/bikes		0.98	1.00		1.00	1.00				1.00	1.00	
Frt		1.00	0.92		1.00	0.92				1.00	0.99	
Flt Protected		0.95	1.00		0.95	1.00				0.95	1.00	
Satd. Flow (prot)		1758	1738		1780	1720				1805	3522	
Flt Permitted		0.60	1.00		0.61	1.00				0.95	1.00	
Satd. Flow (perm)		1109	1738		1135	1720				1805	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	221	80	84	93	80	4	84	16	45	617	61
RTOR Reduction (vph)	0	0	38	0	0	36	0	0	0	0	7	0
Lane Group Flow (vph)	0	225	126	0	93	132	0	0	0	61	671	0
Confl. Peds. (#/hr)	15	6		5	5		15	6	14	15		1
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%
Turn Type	Perm	Perm	NA		Perm	NA			Prot	Prot	NA	
Protected Phases			3			3			5	5	2	
Permitted Phases	3	3			3							
Actuated Green, G (s)		29.0	29.0		29.0	29.0				6.0	35.0	
Effective Green, g (s)		29.0	29.0		29.0	29.0				6.0	35.0	
Actuated g/C Ratio		0.29	0.29		0.29	0.29				0.06	0.35	
Clearance Time (s)		5.0	5.0		5.0	5.0				5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)		321	504		329	498				108	1232	
v/s Ratio Prot			0.07			0.08				c0.03	c0.19	
v/s Ratio Perm		c0.20			0.08							
v/c Ratio		0.70	0.25		0.28	0.26				0.56	0.54	
Uniform Delay, d1		31.6	27.2		27.5	27.3				45.7	26.1	
Progression Factor		1.00	1.00		1.00	1.00				1.00	1.00	
Incremental Delay, d2		12.1	1.2		2.1	1.3				19.7	1.7	
Delay (s)		43.7	28.4		29.6	28.6				65.4	27.8	
Level of Service		D	C		C	C				E	C	
Approach Delay (s)			37.2			29.0					30.9	
Approach LOS			D			C					C	
Intersection Summary												
HCM 2000 Control Delay			40.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			101.1%			ICU Level of Service			G			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 1: Munras Ave & El Dorado St

TAMC Regional ICE - Monterey City
 Future PM (2040)

								
Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER	SER2
Lane Configurations								
Volume (vph)	19	413	76	3	6	5	104	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0				5.0		
Lane Util. Factor	1.00	0.95				1.00		
Frbp, ped/bikes	1.00	0.99				0.89		
Flpb, ped/bikes	1.00	1.00				1.00		
Frt	1.00	0.98				0.87		
Flt Protected	0.95	1.00				1.00		
Satd. Flow (prot)	1805	3460				1478		
Flt Permitted	0.95	1.00				1.00		
Satd. Flow (perm)	1805	3460				1478		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	449	83	3	7	5	113	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	535	0	0	0	163	0	0
Confl. Peds. (#/hr)	9		14	15	6	9	5	14
Confl. Bikes (#/hr)							1	
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA			Prot	Prot		
Protected Phases	1	6			4	4		
Permitted Phases								
Actuated Green, G (s)	6.0	35.0				10.0		
Effective Green, g (s)	6.0	35.0				10.0		
Actuated g/C Ratio	0.06	0.35				0.10		
Clearance Time (s)	5.0	5.0				5.0		
Vehicle Extension (s)	3.0	3.0				3.0		
Lane Grp Cap (vph)	108	1211				147		
v/s Ratio Prot	0.01	0.15				0.11		
v/s Ratio Perm								
v/c Ratio	0.19	0.44				1.11		
Uniform Delay, d1	44.7	25.0				45.0		
Progression Factor	1.00	1.00				1.00		
Incremental Delay, d2	4.0	1.2				106.4		
Delay (s)	48.7	26.2				151.4		
Level of Service	D	C				F		
Approach Delay (s)		27.0				151.4		
Approach LOS		C				F		
Intersection Summary								

MUNRAS AVENUE / ARBREGO STREET AT EL DORADO STREET

Sidra Outputs

LANE SUMMARY

Site: 2015 Proposed AM - Final

Munras Avenue at El Dorado Street
Roundabout

Lane Use and Performance													
	Demand Flows		Cap.	Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	veh/h	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Munras Avenue													
Lane 1 ^d	335	3.1	1130	0.296	100	6.0	LOS A	1.6	39.8	Full	1600	0.0	0.0
Approach	335	3.1		0.296		6.0	LOS A	1.6	39.8				
East: El Dorado Street													
Lane 1 ^d	148	0.7	933	0.158	100	5.4	LOS A	0.7	17.7	Full	1600	0.0	0.0
Approach	148	0.7		0.158		5.4	LOS A	0.7	17.7				
North: Abrego Street													
Lane 1 ^d	346	3.1	1181	0.293	100	5.8	LOS A	1.6	40.0	Full	1600	0.0	0.0
Approach	346	3.1		0.293		5.8	LOS A	1.6	40.0				
NorthWest: Munras Avenue													
Lane 1 ^d	72	3.0	859	0.083	100	5.0	LOS A	0.3	8.7	Full	1600	0.0	0.0
Approach	72	3.0		0.083		5.0	LOS A	0.3	8.7				
West: El Dorado Street													
Lane 1 ^d	187	0.0	1120	0.167	100	4.7	LOS A	0.8	19.8	Full	1600	0.0	0.0
Approach	187	0.0		0.167		4.7	LOS A	0.8	19.8				
Intersection	1087	2.2		0.296		5.6	LOS A	1.6	40.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

Site: 2015 Proposed PM - Final

Munras Avenue at El Dorado Street
Roundabout

Lane Use and Performance													
	Demand Flows		Cap.	Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	veh/h	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Munras Avenue													
Lane 1 ^d	577	0.8	1094	0.528	100	9.5	LOS A	3.6	91.0	Full	1600	0.0	0.0
Approach	577	0.8		0.528		9.5	LOS A	3.6	91.0				
East: El Dorado Street													
Lane 1 ^d	204	0.4	700	0.292	100	8.7	LOS A	1.3	32.5	Full	1000	0.0	0.0
Approach	204	0.4		0.292		8.7	LOS A	1.3	32.5				
North: Abrego Street													
Lane 1 ^d	433	0.8	1179	0.367	100	6.6	LOS A	2.2	54.5	Full	900	0.0	0.0
Approach	433	0.8		0.367		6.6	LOS A	2.2	54.5				
NorthWest: Munras Avenue													
Lane 1 ^d	127	0.0	802	0.159	100	6.1	LOS A	0.7	17.0	Full	800	0.0	0.0
Approach	127	0.0		0.159		6.1	LOS A	0.7	17.0				
West: El Dorado Street													
Lane 1 ^d	303	0.6	832	0.365	100	8.6	LOS A	1.8	45.6	Full	600	0.0	0.0
Approach	303	0.6		0.365		8.6	LOS A	1.8	45.6				
Intersection	1645	0.7		0.528		8.2	LOS A	3.6	91.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Friday, August 07, 2015 2:25:54 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\MCY_03_Munras Ave at El Dorado St
MCY03.sip6

8001045, 6019192, KITTELSON AND ASSOCIATES INC, PLUS / Floating

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

Site: 2040 Proposed AM - Final

Munras Avenue at El Dorado Street
Roundabout

Lane Use and Performance													
	Demand Flows		Cap.	Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	veh/h	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Munras Avenue													
Lane 1 ^d	429	3.1	1065	0.403	100	7.7	LOS A	2.3	58.7	Full	1600	0.0	0.0
Approach	429	3.1		0.403		7.7	LOS A	2.3	58.7				
East: El Dorado Street													
Lane 1 ^d	189	0.7	827	0.229	100	6.8	LOS A	1.0	25.8	Full	1600	0.0	0.0
Approach	189	0.7		0.229		6.8	LOS A	1.0	25.8				
North: Abrego Street													
Lane 1 ^d	443	3.1	1127	0.394	100	7.2	LOS A	2.3	58.7	Full	1600	0.0	0.0
Approach	443	3.1		0.394		7.2	LOS A	2.3	58.7				
NorthWest: Munras Avenue													
Lane 1 ^d	91	3.0	749	0.122	100	6.1	LOS A	0.5	12.6	Full	1600	0.0	0.0
Approach	91	3.0		0.122		6.1	LOS A	0.5	12.6				
West: El Dorado Street													
Lane 1 ^d	239	0.0	1044	0.229	100	5.6	LOS A	1.1	28.0	Full	1600	0.0	0.0
Approach	239	0.0		0.229		5.6	LOS A	1.1	28.0				
Intersection	1392	2.2		0.403		6.9	LOS A	2.3	58.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

Munras Avenue at El Dorado Street
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Munras Avenue													
Lane 1 ^d	739	0.8	1015	0.728	100	16.0	LOS C	8.2	207.0	Full	1600	0.0	0.0
Approach	739	0.8		0.728		16.0	LOS C	8.2	207.0				
East: El Dorado Street													
Lane 1 ^d	262	0.4	573	0.457	100	13.8	LOS B	2.4	59.4	Full	1600	0.0	0.0
Approach	262	0.4		0.457		13.8	LOS B	2.4	59.4				
North: Abrego Street													
Lane 1 ^d	555	0.8	1118	0.497	100	8.8	LOS A	3.3	83.4	Full	1600	0.0	0.0
Approach	555	0.8		0.497		8.8	LOS A	3.3	83.4				
NorthWest: Munras Avenue													
Lane 1 ^d	163	0.0	680	0.240	100	8.2	LOS A	1.0	25.7	Full	1600	0.0	0.0
Approach	163	0.0		0.240		8.2	LOS A	1.0	25.7				
West: El Dorado Street													
Lane 1 ^d	389	0.6	714	0.545	100	13.6	LOS B	3.5	87.1	Full	1600	0.0	0.0
Approach	389	0.6		0.545		13.6	LOS B	3.5	87.1				
Intersection	2109	0.7		0.728		12.8	LOS B	8.2	207.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

EAST FRANKLIN STREET AT CAMINO EL ESTERO

Capital Cost Worksheet

City of Monterey **Capital Cost Worksheet**

MCY_04 East Franklin Street at Camino El Estero

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 701,000	\$ 1,181,925	\$ 480,925	\$ (135,667)	\$ 754,911	\$ 345,258	2.19
High	\$ 771,100	\$ 1,063,733	\$ 292,633			\$ 156,966	4.81
Low	\$ 630,900	\$ 1,300,118	\$ 669,218			\$ 533,551	1.41
Breakeven	\$ 701,000	\$ 1,591,578	\$ 890,578			\$ 754,911	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAABOUT
\$ -	\$ 600,000
\$ -	\$ 800,000
\$ -	\$ 1,000,000
\$ -	\$ 1,200,000
\$ 509,422	\$ 1,400,000
\$ 709,422	\$ 1,600,000
\$ 909,422	\$ 1,800,000
\$ 1,109,422	\$ 2,000,000
\$ 1,309,422	\$ 2,200,000
\$ 1,509,422	\$ 2,400,000

Cost Sensitivity Assumptions

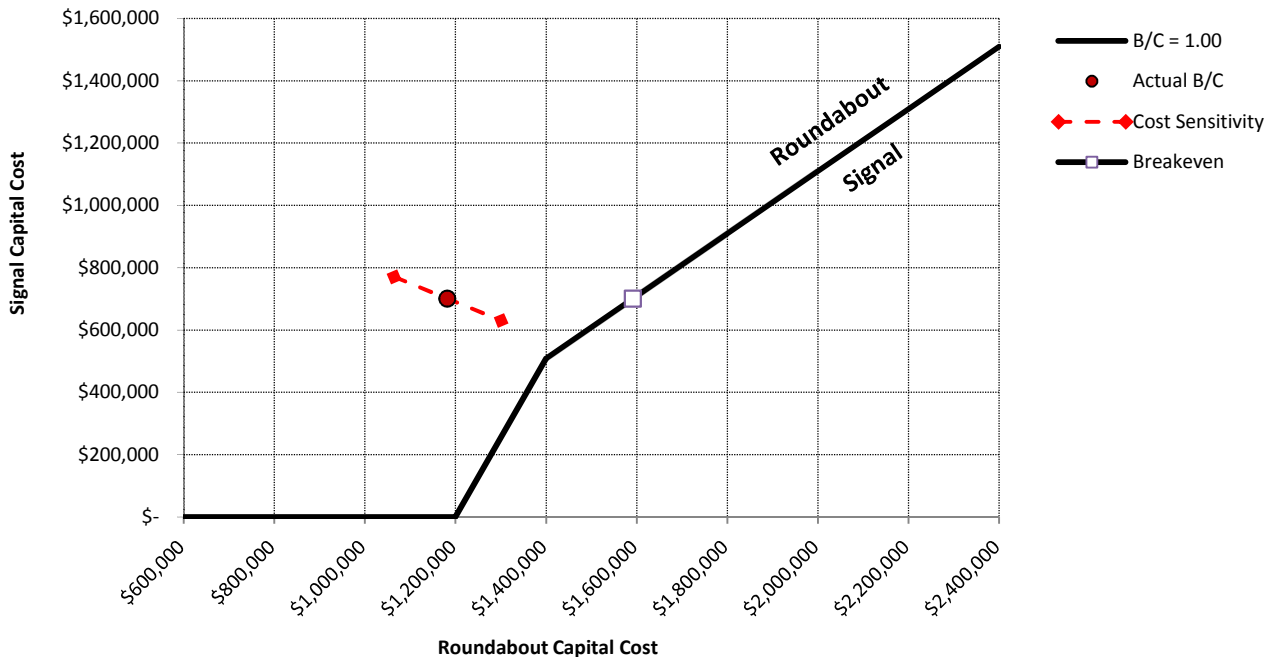
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	35%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 200,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



EAST FRANKLIN STREET AT CAMINO EL ESTERO

Turning Movement Volumes

EXISTING									
PM	NB		WB		SB		EB		
	↑	↻	↶	↷	↶	↑	↶	↑	↻
EXISTING									
Vehicles	223	3	4	2	2	339	257	7	287
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians									
Bicycles									
<i>Source: City of Monterey, October 2, 2015</i>									
CUMULATIVE									
PM	NB		WB		SB		EB		
	↑	↻	↶	↷	↶	↑	↶	↑	↻
CUMULATIVE									
Vehicles	234	3	4	2	2	356	270	7	301
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians									
Bicycles									
<i>Source: Kittelson & Associates, Inc.(5% total growth)</i>									

EAST FRANKLIN STREET AT CAMINO EL ESTERO

Synchro Outputs

Intersection												
Intersection Delay, s/veh	17											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	257	7	287	0	4	0	2	0	0	223	3
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	0	279	8	312	0	4	0	2	0	0	242	3
Number of Lanes	0	1	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	1
HCM Control Delay	15.9	10.8	12.1
HCM LOS	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	0%	0%	100%	0%	67%	1%
Vol Thru, %	100%	96%	0%	2%	0%	99%
Vol Right, %	0%	4%	0%	98%	33%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	149	77	257	294	6	341
LT Vol	0	0	257	0	4	2
Through Vol	149	74	0	7	0	339
RT Vol	0	3	0	287	2	0
Lane Flow Rate	162	84	279	320	7	371
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.308	0.16	0.54	0.511	0.014	0.672
Departure Headway (Hd)	6.871	6.843	6.963	5.761	7.658	6.527
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	522	522	517	623	470	552
Service Time	4.637	4.609	4.72	3.517	5.658	4.578
HCM Lane V/C Ratio	0.31	0.161	0.54	0.514	0.015	0.672
HCM Control Delay	12.7	10.9	17.7	14.4	10.8	22
HCM Lane LOS	B	B	C	B	B	C
HCM 95th-tile Q	1.3	0.6	3.2	2.9	0	5

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	2	339	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	368	0
Number of Lanes	0	0	1	0






Approach SB

Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	22
HCM LOS	C

Lane

Queues

1: Camino El Estero & Franklin St

					
Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	279	320	6	245	370
v/c Ratio	0.45	0.42	0.02	0.19	0.54
Control Delay	13.3	4.1	0.0	8.9	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	4.1	0.0	8.9	13.3
Queue Length 50th (ft)	32	1	0	14	47
Queue Length 95th (ft)	137	48	0	48	164
Internal Link Dist (ft)		167	72	167	138
Turn Bay Length (ft)					
Base Capacity (vph)	994	1030	1033	2425	1276
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.31	0.01	0.10	0.29

Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Camino El Estero & Franklin St

TAMC Regional ICE - Monterey City
 Proposed PM (2015)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	257	7	287	4	0	2	0	223	3	2	339	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1900	1863	1900	0	1863	1900	1900	1863	0
Adj Flow Rate, veh/h	279	8	312	4	0	2	0	242	3	2	368	0
Adj No. of Lanes	1	1	0	0	1	0	0	2	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	0
Cap, veh/h	540	12	471	9	0	5	0	1164	14	110	604	0
Arrive On Green	0.30	0.30	0.30	0.01	0.00	0.01	0.00	0.33	0.33	0.33	0.33	0.00
Sat Flow, veh/h	1774	40	1550	1137	0	569	0	3673	44	3	1859	0
Grp Volume(v), veh/h	279	0	320	6	0	0	0	119	126	370	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1589	1706	0	0	0	1770	1855	1861	0	0
Q Serve(g_s), s	4.3	0.0	5.8	0.1	0.0	0.0	0.0	1.6	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.3	0.0	5.8	0.1	0.0	0.0	0.0	1.6	1.6	5.5	0.0	0.0
Prop In Lane	1.00		0.98	0.67		0.33	0.00		0.02	0.01		0.00
Lane Grp Cap(c), veh/h	540	0	483	14	0	0	0	575	603	715	0	0
V/C Ratio(X)	0.52	0.00	0.66	0.43	0.00	0.00	0.00	0.21	0.21	0.52	0.00	0.00
Avail Cap(c_a), veh/h	965	0	864	928	0	0	0	1176	1233	1345	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	0.00	0.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.5	0.0	10.0	16.3	0.0	0.0	0.0	8.1	8.1	9.4	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	1.6	20.0	0.0	0.0	0.0	0.2	0.2	0.6	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	2.2	0.0	2.7	0.1	0.0	0.0	0.0	0.8	0.8	2.9	0.0	0.0
LnGrp Delay(d),s/veh	10.3	0.0	11.6	36.3	0.0	0.0	0.0	8.3	8.3	10.0	0.0	0.0
LnGrp LOS	B		B	D				A	A	A		
Approach Vol, veh/h		599			6			245			370	
Approach Delay, s/veh		11.0			36.3			8.3			10.0	
Approach LOS		B			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.8		14.1		14.8		4.3				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		22.0		18.0		22.0		18.0				
Max Q Clear Time (g_c+I1), s		3.6		7.8		7.5		2.1				
Green Ext Time (p_c), s		3.6		2.3		3.2		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			10.3									
HCM 2010 LOS			B									

Intersection												
Intersection Delay, s/veh	18.7											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	270	8	302	0	5	0	3	0	0	235	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	0	293	9	328	0	5	0	3	0	0	255	4
Number of Lanes	0	1	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	1
HCM Control Delay	17.3	11	12.6
HCM LOS	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	0%	0%	100%	0%	62%	1%
Vol Thru, %	100%	95%	0%	3%	0%	99%
Vol Right, %	0%	5%	0%	97%	38%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	157	82	270	310	8	359
LT Vol	0	0	270	0	5	3
Through Vol	157	78	0	8	0	356
RT Vol	0	4	0	302	3	0
Lane Flow Rate	170	89	293	337	9	390
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.332	0.174	0.578	0.551	0.019	0.72
Departure Headway (Hd)	7.024	6.989	7.093	5.891	7.866	6.644
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	509	511	508	610	458	542
Service Time	4.797	4.762	4.854	3.652	5.866	4.701
HCM Lane V/C Ratio	0.334	0.174	0.577	0.552	0.02	0.72
HCM Control Delay	13.3	11.2	19.2	15.7	11	25.1
HCM Lane LOS	B	B	C	C	B	D
HCM 95th-tile Q	1.4	0.6	3.6	3.4	0.1	5.9

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	3	356	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	3	387	0
Number of Lanes	0	0	1	0






Approach SB

Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	25.1
HCM LOS	D

Lane



















Queues

1: Camino El Estero & Franklin St

					
Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	293	337	8	259	390
v/c Ratio	0.47	0.44	0.02	0.20	0.56
Control Delay	13.8	4.2	0.1	8.9	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	4.2	0.1	8.9	13.7
Queue Length 50th (ft)	36	1	0	15	52
Queue Length 95th (ft)	146	50	0	51	174
Internal Link Dist (ft)		167	72	167	138
Turn Bay Length (ft)					
Base Capacity (vph)	967	1018	1002	2360	1242
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.30	0.33	0.01	0.11	0.31
Intersection Summary					

HCM 2010 Signalized Intersection Summary
 1: Camino El Estero & Franklin St

TAMC Regional ICE - Monterey City
 Proposed PM (2040)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	270	8	302	5	0	3	0	235	4	3	356	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1900	1863	1900	0	1863	1900	1900	1863	0
Adj Flow Rate, veh/h	293	9	328	5	0	3	0	255	4	3	387	0
Adj No. of Lanes	1	1	0	0	1	0	0	2	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	0
Cap, veh/h	551	13	481	11	0	7	0	1184	19	106	616	0
Arrive On Green	0.31	0.31	0.31	0.01	0.00	0.01	0.00	0.33	0.33	0.33	0.33	0.00
Sat Flow, veh/h	1774	42	1547	1061	0	637	0	3660	56	4	1857	0
Grp Volume(v), veh/h	293	0	337	8	0	0	0	126	133	390	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1590	1697	0	0	0	1770	1853	1860	0	0
Q Serve(g_s), s	4.7	0.0	6.4	0.2	0.0	0.0	0.0	1.8	1.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.7	0.0	6.4	0.2	0.0	0.0	0.0	1.8	1.8	6.1	0.0	0.0
Prop In Lane	1.00		0.97	0.62		0.37	0.00		0.03	0.01		0.00
Lane Grp Cap(c), veh/h	551	0	494	18	0	0	0	587	615	722	0	0
V/C Ratio(X)	0.53	0.00	0.68	0.44	0.00	0.00	0.00	0.22	0.22	0.54	0.00	0.00
Avail Cap(c_a), veh/h	923	0	827	883	0	0	0	1125	1178	1285	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	0.00	0.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.9	0.0	10.4	17.0	0.0	0.0	0.0	8.3	8.3	9.8	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	1.7	15.9	0.0	0.0	0.0	0.2	0.2	0.6	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	2.4	0.0	3.0	0.2	0.0	0.0	0.0	0.9	0.9	3.3	0.0	0.0
LnGrp Delay(d),s/veh	10.6	0.0	12.1	32.9	0.0	0.0	0.0	8.5	8.5	10.4	0.0	0.0
LnGrp LOS	B		B	C				A	A	B		
Approach Vol, veh/h		630			8			259			390	
Approach Delay, s/veh		11.4			32.9			8.5			10.4	
Approach LOS		B			C			A			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		15.5		14.7		15.5		4.4				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		22.0		18.0		22.0		18.0				
Max Q Clear Time (g_c+I1), s		3.8		8.4		8.1		2.2				
Green Ext Time (p_c), s		3.8		2.4		3.4		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			10.7									
HCM 2010 LOS			B									

EAST FRANKLIN STREET AT CAMINO EL ESTERO

Sidra Outputs

LANE SUMMARY

 Site: 2015 Proposed PM - Final

E Franklin St at Camino El Estero
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Camino El Estero													
Lane 1 ^d	246	2.0	1065	0.231	100	5.5	LOS A	1.1	28.7	Full	400	0.0	0.0
Approach	246	2.0		0.231		5.5	LOS A	1.1	28.7				
East: E Franklin St													
Lane 1 ^d	7	2.0	842	0.008	100	4.3	LOS A	0.0	0.8	Full	100	0.0	0.0
Approach	7	2.0		0.008		4.3	LOS A	0.0	0.8				
North: Camino El Estero													
Lane 1 ^d	371	2.0	1419	0.261	100	4.7	LOS A	1.5	37.9	Full	320	0.0	0.0
Approach	371	2.0		0.261		4.7	LOS A	1.5	37.9				
West: E Franklin St													
Lane 1 ^d	599	2.0	995	0.602	100	12.0	LOS B	4.6	117.8	Full	700	0.0	0.0
Approach	599	2.0		0.602		12.0	LOS B	4.6	117.8				
Intersection	1222	2.0		0.602		8.4	LOS A	4.6	117.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

E Franklin St at Camino El Estero
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Camino El Estero													
Lane 1 ^d	260	2.0	1047	0.248	100	5.8	LOS A	1.2	31.1	Full	400	0.0	0.0
Approach	260	2.0		0.248		5.8	LOS A	1.2	31.1				
East: E Franklin St													
Lane 1 ^d	9	2.0	819	0.011	100	4.5	LOS A	0.0	1.1	Full	100	0.0	0.0
Approach	9	2.0		0.011		4.5	LOS A	0.0	1.1				
North: Camino El Estero													
Lane 1 ^d	390	2.0	1418	0.275	100	4.9	LOS A	1.6	40.7	Full	320	0.0	0.0
Approach	390	2.0		0.275		4.9	LOS A	1.6	40.7				
West: E Franklin St													
Lane 1 ^d	630	2.0	975	0.647	100	13.4	LOS B	5.4	137.8	Full	700	0.0	0.0
Approach	630	2.0		0.647		13.4	LOS B	5.4	137.8				
Intersection	1289	2.0		0.647		9.2	LOS A	5.4	137.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Regional Intersection Control Evaluation
Section 7:

City of Pacific Grove

Appendix B7: Analysis Worksheets

Study Intersections:

- FIRST STREET AT CENTRAL AVENUE



FIRST STREET AT CENTRAL AVENUE

Capital Cost Worksheet

City of Pacific Grove **Capital Cost Worksheet**

PCG_01 First Street at Central Avenue

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAOBT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 95,000	\$ 730,925	\$ 635,925	\$ 23,982	\$ 626,205	\$ 659,907	0.95
High	\$ 104,500	\$ 657,833	\$ 553,333			\$ 577,315	1.08
Low	\$ 85,500	\$ 804,018	\$ 718,518			\$ 742,500	0.84
Breakeven	\$ 95,000	\$ 697,223	\$ 602,223			\$ 626,205	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAOBT
\$ -	\$ 200,000
\$ -	\$ 300,000
\$ -	\$ 400,000
\$ -	\$ 500,000
\$ -	\$ 600,000
\$ 97,777	\$ 700,000
\$ 197,777	\$ 800,000
\$ 297,777	\$ 900,000
\$ 397,777	\$ 1,000,000
\$ 497,777	\$ 1,100,000

Cost Sensitivity Assumptions

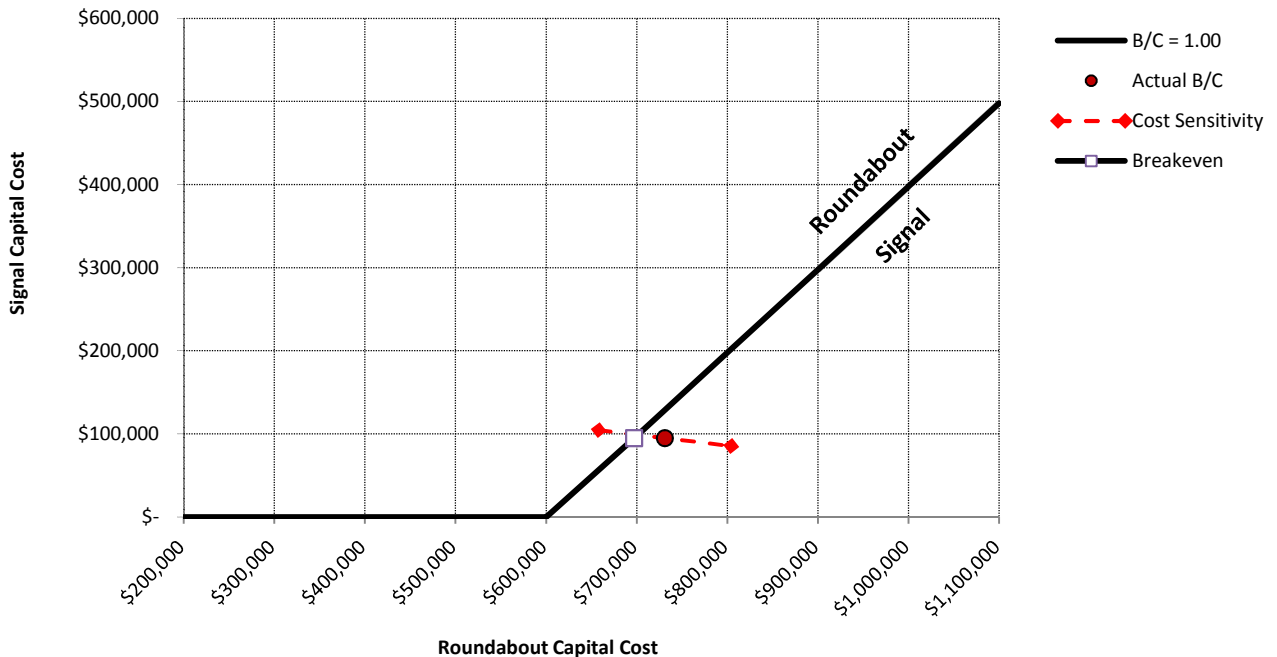
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	-5%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase \$ 100,000 (x axis major unit)
 Min Signal Cost \$ - (Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



FIRST STREET AT CENTRAL AVENUE

Turning Movement Volumes

EXISTING									
AM	WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING									
Vehicles	5	179	10	60	5	3	11	172	40
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians									
Bicycles									

PM	WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING									
Vehicles	5	166	58	31	15	34	2	162	19
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians									
Bicycles									

Source: City of Pacific Grove, June 2014

CUMULATIVE									
AM	WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE									
Vehicles	6	232	13	78	6	4	14	223	52
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians									
Bicycles									

PM	WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE									
Vehicles	6	215	75	40	19	44	3	210	25
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians									
Bicycles									

Source: Kittelson & Associates, Inc. (1% growth rate)

FIRST STREET AT CENTRAL AVENUE

Synchro Outputs

Intersection

Int Delay, s/veh 4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	172	40	5	179	10	0	0	0	60	5	3
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	-	-	-	-	-	-	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	75
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	1	187	43	5	195	11	0	0	0	65	5	3

Major/Minor	Major1	Major2	Minor2						
Conflicting Flow All	205	0	0	1	0	0	211	236	200
Stage 1	-	-	-	-	-	-	211	211	-
Stage 2	-	-	-	-	-	-	0	25	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1366	-	-	-	-	-	777	665	841
Stage 1	-	-	-	-	-	-	824	728	-
Stage 2	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1366	-	-	-	-	-	769	0	841
Mov Cap-2 Maneuver	-	-	-	-	-	-	769	0	-
Stage 1	-	-	-	-	-	-	824	0	-
Stage 2	-	-	-	-	-	-	-	0	-

Approach	EB	WB	SB
HCM Control Delay, s	7.6		9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL2	EBL	EBT	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1366	-	-	-	-	-	841	-
HCM Lane V/C Ratio	0.009	-	-	-	-	-	0.006	-
HCM Control Delay (s)	7.7	-	7.7	-	-	-	9.3	0
HCM Lane LOS	A	-	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-	0	-

Intersection

Int Delay, s/veh

Movement	SWL	SWR
Vol, veh/h	0	0
Conflicting Peds, #/hr	0	0
Sign Control	Stop	Stop
RT Channelized	-	-
Storage Length	-	-
Veh in Median Storage, #	0	-
Grade, %	0	-
Peak Hour Factor	92	92
Heavy Vehicles, %	2	2
Mvmt Flow	0	0

Major/Minor

Conflicting Flow All

Stage 1

Stage 2

Critical Hdwy

Critical Hdwy Stg 1

Critical Hdwy Stg 2

Follow-up Hdwy

Pot Cap-1 Maneuver

Stage 1

Stage 2

Platoon blocked, %

Mov Cap-1 Maneuver

Mov Cap-2 Maneuver

Stage 1

Stage 2

Approach

HCM Control Delay, s

HCM LOS

Minor Lane/Major Mvmt

Intersection												
Int Delay, s/veh	3.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	162	19	5	166	58	0	0	0	31	15	34
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	-	-	-	-	-	-	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	75
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	1	176	21	5	180	63	0	0	0	34	16	37

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	243	0	0	1	0	0	223	228	212
Stage 1	-	-	-	-	-	-	223	223	-
Stage 2	-	-	-	-	-	-	0	5	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1323	-	-	-	-	-	765	671	828
Stage 1	-	-	-	-	-	-	814	719	-
Stage 2	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1323	-	-	-	-	-	763	0	828
Mov Cap-2 Maneuver	-	-	-	-	-	-	763	0	-
Stage 1	-	-	-	-	-	-	814	0	-
Stage 2	-	-	-	-	-	-	-	0	-

Approach	EB	WB	SB
HCM Control Delay, s	7.7		9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL2	EBL	EBT	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1323	-	-	-	-	-	828	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	0.02	-
HCM Control Delay (s)	7.7	-	7.7	-	-	-	9.4	0
HCM Lane LOS	A	-	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-	0.1	-

Intersection

Int Delay, s/veh

Movement	SWL	SWR
Vol, veh/h	0	0
Conflicting Peds, #/hr	0	0
Sign Control	Stop	Stop
RT Channelized	-	-
Storage Length	-	-
Veh in Median Storage, #	0	-
Grade, %	0	-
Peak Hour Factor	92	92
Heavy Vehicles, %	2	2
Mvmt Flow	0	0

Major/Minor

Conflicting Flow All	
Stage 1	
Stage 2	
Critical Hdwy	
Critical Hdwy Stg 1	
Critical Hdwy Stg 2	
Follow-up Hdwy	
Pot Cap-1 Maneuver	
Stage 1	
Stage 2	
Platoon blocked, %	
Mov Cap-1 Maneuver	
Mov Cap-2 Maneuver	
Stage 1	
Stage 2	

Approach

HCM Control Delay, s
 HCM LOS

Minor Lane/Major Mvmt

Intersection													
Int Delay, s/veh	4.7												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	223	52	6	232	13	0	0	0	78	6	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	-	-	-	-	-	-	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	75
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	1	242	57	7	252	14	0	0	0	85	7	4

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	266	0	0	1	0	0	272	304	259
Stage 1	-	-	-	-	-	-	272	272	-
Stage 2	-	-	-	-	-	-	0	32	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1298	-	-	-	-	-	717	609	780
Stage 1	-	-	-	-	-	-	774	685	-
Stage 2	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1298	-	-	-	-	-	707	0	780
Mov Cap-2 Maneuver	-	-	-	-	-	-	707	0	-
Stage 1	-	-	-	-	-	-	774	0	-
Stage 2	-	-	-	-	-	-	-	0	-

Approach	EB	WB	SB
HCM Control Delay, s	7.8		9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL2	EBL	EBT	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1298	-	-	-	-	-	780	-
HCM Lane V/C Ratio	0.012	-	-	-	-	-	0.008	-
HCM Control Delay (s)	7.8	-	7.8	-	-	-	9.7	0
HCM Lane LOS	A	-	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-	0	-

Intersection

Int Delay, s/veh

Movement	SWL	SWR
Vol, veh/h	0	0
Conflicting Peds, #/hr	0	0
Sign Control	Stop	Stop
RT Channelized	-	-
Storage Length	-	-
Veh in Median Storage, #	0	-
Grade, %	0	-
Peak Hour Factor	92	92
Heavy Vehicles, %	2	2
Mvmt Flow	0	0

Major/Minor

Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach

HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Intersection

Int Delay, s/veh 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	210	25	6	215	75	0	0	0	40	19	44
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	-	-	-	-	-	-	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	75
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	1	228	27	7	234	82	0	0	0	43	21	48

Major/Minor	Major1	Major2	Minor2						
Conflicting Flow All	315	0	0	1	0	0	288	300	274
Stage 1	-	-	-	-	-	-	288	288	-
Stage 2	-	-	-	-	-	-	0	12	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1245	-	-	-	-	-	702	612	765
Stage 1	-	-	-	-	-	-	761	674	-
Stage 2	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1245	-	-	-	-	-	698	0	765
Mov Cap-2 Maneuver	-	-	-	-	-	-	698	0	-
Stage 1	-	-	-	-	-	-	761	0	-
Stage 2	-	-	-	-	-	-	-	0	-

Approach	EB	WB	SB
HCM Control Delay, s	7.9		9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL2	EBL	EBT	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1245	-	-	-	-	-	765	-
HCM Lane V/C Ratio	0.004	-	-	-	-	-	0.027	-
HCM Control Delay (s)	7.9	-	7.9	-	-	-	9.8	0
HCM Lane LOS	A	-	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-	0.1	-

Intersection

Int Delay, s/veh

Movement	SWL	SWR
Vol, veh/h	0	0
Conflicting Peds, #/hr	0	0
Sign Control	Stop	Stop
RT Channelized	-	-
Storage Length	-	-
Veh in Median Storage, #	0	-
Grade, %	0	-
Peak Hour Factor	92	92
Heavy Vehicles, %	2	2
Mvmt Flow	0	0

Major/Minor

Conflicting Flow All

Stage 1

Stage 2

Critical Hdwy

Critical Hdwy Stg 1

Critical Hdwy Stg 2

Follow-up Hdwy

Pot Cap-1 Maneuver

Stage 1

Stage 2

Platoon blocked, %

Mov Cap-1 Maneuver

Mov Cap-2 Maneuver

Stage 1

Stage 2

Approach

HCM Control Delay, s

HCM LOS

Minor Lane/Major Mvmt

FIRST STREET AT CENTRAL AVENUE

Sidra Outputs

LANE SUMMARY

 Site: 2015 Proposed AM - Final

PCG 2015 AM
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
East: Central Ave													
Lane 1 ^d	212	2.0	1391	0.152	100	3.8	LOS A	0.8	19.1	Full	1350	0.0	0.0
Approach	212	2.0		0.152		3.8	LOS A	0.8	19.1				
North: First Street													
Lane 1 ^d	75	2.0	1151	0.065	100	3.7	LOS A	0.3	7.1	Full	350	0.0	0.0
Approach	75	2.0		0.065		3.7	LOS A	0.3	7.1				
West: Central Ave													
Lane 1 ^d	243	2.0	1305	0.187	100	4.3	LOS A	0.9	23.7	Full	1600	0.0	0.0
Approach	243	2.0		0.187		4.3	LOS A	0.9	23.7				
Intersection	530	2.0		0.187		4.0	LOS A	0.9	23.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 **Site: 2015 Proposed PM**

PCG 2015 AM
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
East: Central Ave													
Lane 1 ^d	249	2.0	1409	0.177	100	4.0	LOS A	0.9	22.8	Full	1600	0.0	0.0
Approach	249	2.0		0.177		4.0	LOS A	0.9	22.8				
North: First Street													
Lane 1 ^d	87	2.0	1168	0.074	100	3.7	LOS A	0.3	8.2	Full	1600	0.0	0.0
Approach	87	2.0		0.074		3.7	LOS A	0.3	8.2				
West: Central Ave													
Lane 1 ^d	199	2.0	1334	0.149	100	3.9	LOS A	0.7	18.3	Full	1600	0.0	0.0
Approach	199	2.0		0.149		3.9	LOS A	0.7	18.3				
Intersection	535	2.0		0.177		3.9	LOS A	0.9	22.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed AM - Final

PCG 2015 AM
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
East: Central Ave													
Lane 1 ^d	273	2.0	1390	0.196	100	4.2	LOS A	1.0	25.8	Full	1600	0.0	0.0
Approach	273	2.0		0.196		4.2	LOS A	1.0	25.8				
North: First Street													
Lane 1 ^d	96	2.0	1084	0.088	100	4.1	LOS A	0.4	9.7	Full	1600	0.0	0.0
Approach	96	2.0		0.088		4.1	LOS A	0.4	9.7				
West: Central Ave													
Lane 1 ^d	314	2.0	1278	0.246	100	5.0	LOS A	1.3	33.1	Full	1600	0.0	0.0
Approach	314	2.0		0.246		5.0	LOS A	1.3	33.1				
Intersection	683	2.0		0.246		4.5	LOS A	1.3	33.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

PCG 2015 AM
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
East: Central Ave													
Lane 1 ^d	322	2.0	1404	0.229	100	4.5	LOS A	1.2	31.5	Full	1600	0.0	0.0
Approach	322	2.0		0.229		4.5	LOS A	1.2	31.5				
North: First Street													
Lane 1 ^d	112	2.0	1105	0.101	100	4.1	LOS A	0.4	11.3	Full	1600	0.0	0.0
Approach	112	2.0		0.101		4.1	LOS A	0.4	11.3				
West: Central Ave													
Lane 1 ^d	261	2.0	1314	0.199	100	4.4	LOS A	1.0	25.7	Full	1600	0.0	0.0
Approach	261	2.0		0.199		4.4	LOS A	1.0	25.7				
Intersection	695	2.0		0.229		4.4	LOS A	1.2	31.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Regional Intersection Control Evaluation
Section 8:

City of Salinas

Appendix B8: Analysis Worksheets

Study Intersections:

- WEST ALISAL STREET AT CAPITOL STREET
- EAST LAUREL DRIVE AT ST. EDWARDS STREET
- SHERWOOD DRIVE AT SHERWOOD PLACE



WEST ALISAL STREET AT CAPITOL STREET

Capital Cost Worksheet

City of Salinas **Capital Cost Worksheet**

SAL_01	West Alisal Street at Capitol Street						
	<u>Capital Cost</u>			<u>Project Constants</u>			
	SIGNAL	ROUNDAABOUT	Added Cost for Roundabout	Added O&M Cost for Roundabout	Total Benefits	Total Costs	B/C
B/C Target	(a)	(b)	(c) = (b - a)	(d)	(e)	(f) = (c + d)	(g) = (e / f)
Actual	\$ 653,200	\$ 1,181,975	\$ 528,775	\$ (97,895)	\$ 679,499	\$ 430,880	1.58
High	\$ 718,520	\$ 1,063,778	\$ 345,258			\$ 247,363	2.75
Low	\$ 587,880	\$ 1,300,173	\$ 712,293			\$ 614,398	1.11
Breakeven	\$ 653,200	\$ 1,430,594	\$ 777,394			\$ 679,499	1.00
Custom 1							
Custom 2							

Capital Cost Relationship (B/C=1.00)

SIGNAL	ROUNDAABOUT
\$ -	\$ 600,000
\$ -	\$ 800,000
\$ -	\$ 1,000,000
\$ 422,606	\$ 1,200,000
\$ 622,606	\$ 1,400,000
\$ 822,606	\$ 1,600,000
\$ 1,022,606	\$ 1,800,000
\$ 1,222,606	\$ 2,000,000
\$ 1,422,606	\$ 2,200,000
\$ 1,622,606	\$ 2,400,000

Cost Sensitivity Assumptions

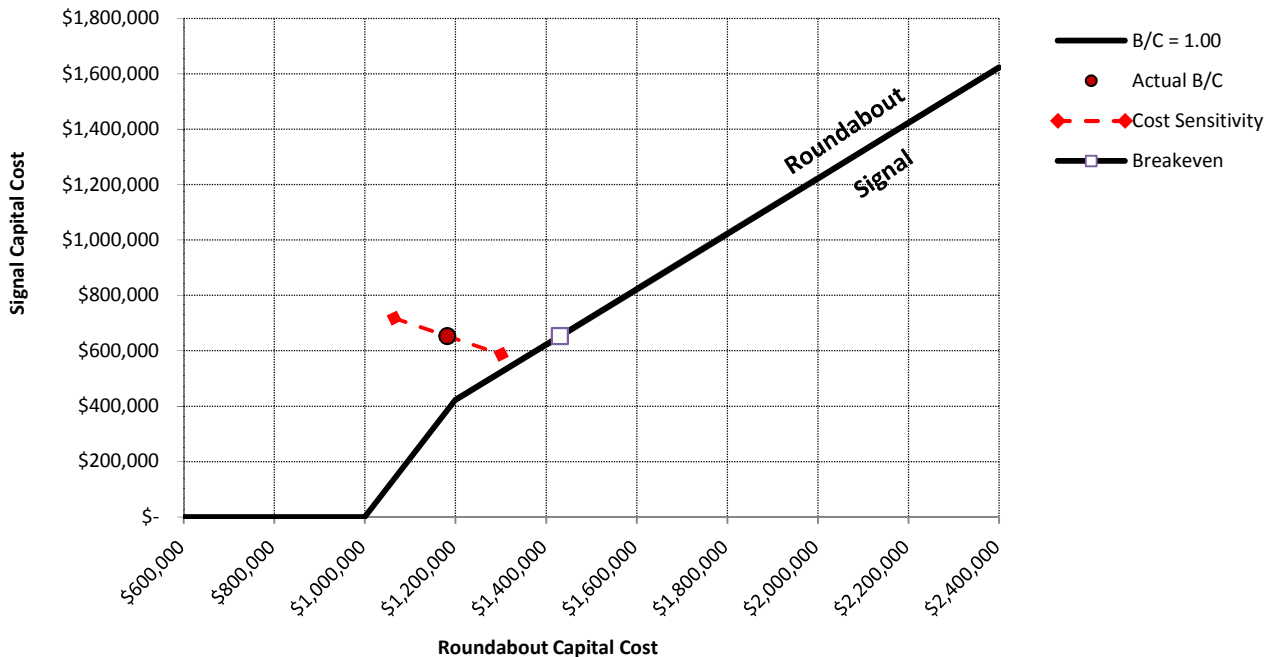
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	21%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 200,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



WEST ALISAL STREET AT CAPITOL STREET

Turning Movement Volumes

EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	1	8	3	10	509	107	22	20	93	149	567	23
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	7	7	26	5	601	36	31	24	120	64	604	7
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
<i>Source: City of Salinas, October 6,</i>												

CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	1	12	4	16	747	157	32	29	136	218	843	34
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	10	10	38	7	893	53	45	35	176	94	889	10
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
<i>Source: Kimley-Horn, July 27, 2005</i>												

WEST ALISAL STREET AT CAPITOL STREET

Synchro Outputs

Intersection												
Int Delay, s/veh	4.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	149	567	23	10	509	107	0	8	3	22	20	93
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	-	-	25	-	-	125	-	-	-	-	-	75
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	162	616	25	11	553	116	0	9	3	24	22	101

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	553	0	0	616	0	0	1249	1515	308	1211	1515	277
Stage 1	-	-	-	-	-	-	940	940	-	575	575	-
Stage 2	-	-	-	-	-	-	309	575	-	636	940	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1013	-	-	960	-	-	129	118	688	138	118	720
Stage 1	-	-	-	-	-	-	283	340	-	470	501	-
Stage 2	-	-	-	-	-	-	676	501	-	433	340	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1013	-	-	960	-	-	72	87	688	101	87	720
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	87	-	101	87	-
Stage 1	-	-	-	-	-	-	212	255	-	353	491	-
Stage 2	-	-	-	-	-	-	545	491	-	312	255	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0.2	40.2	30.8
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	114	1013	-	-	960	-	-	94	720
HCM Lane V/C Ratio	0.105	0.16	-	-	0.011	-	-	0.486	0.14
HCM Control Delay (s)	40.2	9.2	0.4	-	8.8	0.1	-	75.1	10.8
HCM Lane LOS	E	A	A	-	A	A	-	F	B
HCM 95th %tile Q(veh)	0.3	0.6	-	-	0	-	-	2.1	0.5

Intersection												
Int Delay, s/veh	4.3											










Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	64	604	7	5	601	36	7	7	26	31	24	120
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	-	-	25	-	-	125	-	-	-	-	-	75
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	70	657	8	5	653	39	8	8	28	34	26	130

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	653	0	0	657	0	0	1147	1460	328	1135	1460	327
Stage 1	-	-	-	-	-	-	796	796	-	664	664	-
Stage 2	-	-	-	-	-	-	351	664	-	471	796	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	930	-	-	926	-	-	154	128	668	157	128	669
Stage 1	-	-	-	-	-	-	347	397	-	416	456	-
Stage 2	-	-	-	-	-	-	639	456	-	542	397	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	930	-	-	926	-	-	92	112	668	129	112	669
Mov Cap-2 Maneuver	-	-	-	-	-	-	92	112	-	129	112	-
Stage 1	-	-	-	-	-	-	306	350	-	366	452	-
Stage 2	-	-	-	-	-	-	480	452	-	447	350	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.1	24.8	27.1
HCM LOS			C	D






















Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	225	930	-	-	926	-	-	121	669
HCM Lane V/C Ratio	0.193	0.075	-	-	0.006	-	-	0.494	0.195
HCM Control Delay (s)	24.8	9.2	0.3	-	8.9	0	-	60.8	11.7
HCM Lane LOS	C	A	A	-	A	A	-	F	B
HCM 95th %tile Q(veh)	0.7	0.2	-	-	0	-	-	2.3	0.7

Queues
3: Capitol Street & Alisal St










									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	162	616	25	11	553	116	12	46	101
v/c Ratio	0.27	0.44	0.02	0.02	0.40	0.10	0.02	0.09	0.19
Control Delay	5.0	5.0	2.1	3.3	4.6	1.2	12.1	13.4	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	5.0	2.1	3.3	4.6	1.2	12.1	13.4	5.5
Queue Length 50th (ft)	12	54	1	1	46	0	1	6	0
Queue Length 95th (ft)	37	121	5	4	103	10	11	29	28
Internal Link Dist (ft)		292			376		126	148	
Turn Bay Length (ft)	100		25	100		125			75
Base Capacity (vph)	701	1622	1243	626	1622	1393	1461	1394	1304
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.38	0.02	0.02	0.34	0.08	0.01	0.03	0.08
Intersection Summary									

HCM 2010 Signalized Intersection Summary
 3: Capitol Street & Alisal St

TAMC Regional ICE - Salinas
 Proposed AM (2013)






















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	149	567	23	10	509	107	0	8	3	22	20	93
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1900	1900	1863	1863
Adj Flow Rate, veh/h	162	616	25	11	553	116	0	9	3	24	22	101
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	569	1158	886	557	1158	984	0	186	62	244	152	220
Arrive On Green	0.62	0.62	0.62	0.62	0.62	0.62	0.00	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	765	1863	1425	785	1863	1583	0	1338	446	573	1099	1583
Grp Volume(v), veh/h	162	616	25	11	553	116	0	0	12	46	0	101
Grp Sat Flow(s),veh/h/ln	765	1863	1425	785	1863	1583	0	0	1784	1672	0	1583
Q Serve(g_s), s	4.8	6.2	0.2	0.3	5.3	1.0	0.0	0.0	0.2	0.0	0.0	2.0
Cycle Q Clear(g_c), s	10.2	6.2	0.2	6.5	5.3	1.0	0.0	0.0	0.2	0.7	0.0	2.0
Prop In Lane	1.00		1.00	1.00		1.00	0.00		0.25	0.52		1.00
Lane Grp Cap(c), veh/h	569	1158	886	557	1158	984	0	0	247	396	0	220
V/C Ratio(X)	0.28	0.53	0.03	0.02	0.48	0.12	0.00	0.00	0.05	0.12	0.00	0.46
Avail Cap(c_a), veh/h	713	1508	1154	705	1508	1282	0	0	1337	1365	0	1187
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.1	3.6	2.4	5.4	3.4	2.6	0.0	0.0	12.5	12.7	0.0	13.2
Incr Delay (d2), s/veh	0.3	0.4	0.0	0.0	0.3	0.1	0.0	0.0	0.1	0.1	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.0	3.2	0.1	0.1	2.7	0.4	0.0	0.0	0.1	0.4	0.0	0.9
LnGrp Delay(d),s/veh	6.4	4.0	2.4	5.4	3.7	2.6	0.0	0.0	12.5	12.8	0.0	14.7
LnGrp LOS	A	A	A	A	A	A			B	B		B
Approach Vol, veh/h		803			680			12				147
Approach Delay, s/veh		4.4			3.6			12.5				14.1
Approach LOS		A			A			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		8.6		24.7		8.6		24.7				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		25.0		27.0		25.0		27.0				
Max Q Clear Time (g_c+I1), s		2.2		12.2		4.0		8.5				
Green Ext Time (p_c), s		0.6		8.6		0.6		9.8				
Intersection Summary												
HCM 2010 Ctrl Delay			5.0									
HCM 2010 LOS			A									

Queues
3: Capitol Street & Alisal St

									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	70	657	8	5	653	39	44	60	130
v/c Ratio	0.18	0.56	0.01	0.01	0.55	0.04	0.10	0.15	0.25
Control Delay	5.3	7.2	1.3	3.6	7.2	1.7	8.6	13.4	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	7.2	1.3	3.6	7.2	1.7	8.6	13.4	5.2
Queue Length 50th (ft)	5	62	0	0	61	0	2	8	0
Queue Length 95th (ft)	19	144	2	3	142	6	21	35	30
Internal Link Dist (ft)		292			376		126	148	
Turn Bay Length (ft)	100		25	100		125			75
Base Capacity (vph)	525	1585	1215	520	1585	1353	1272	1196	1296
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.41	0.01	0.01	0.41	0.03	0.03	0.05	0.10
Intersection Summary									

HCM 2010 Signalized Intersection Summary
 3: Capitol Street & Alisal St

TAMC Regional ICE - Salinas
 Proposed PM (2013)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	64	604	7	5	601	36	7	7	26	31	24	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1900	1900	1863	1863
Adj Flow Rate, veh/h	70	657	8	5	653	39	8	8	28	34	26	130
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	506	1125	861	512	1125	956	150	69	162	271	154	251
Arrive On Green	0.60	0.60	0.60	0.60	0.60	0.60	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	749	1863	1425	768	1863	1583	149	435	1021	651	975	1583
Grp Volume(v), veh/h	70	657	8	5	653	39	44	0	0	60	0	130
Grp Sat Flow(s),veh/h/ln	749	1863	1425	768	1863	1583	1605	0	0	1626	0	1583
Q Serve(g_s), s	2.1	7.3	0.1	0.1	7.2	0.3	0.0	0.0	0.0	0.0	0.0	2.5
Cycle Q Clear(g_c), s	9.3	7.3	0.1	7.4	7.2	0.3	0.8	0.0	0.0	0.9	0.0	2.5
Prop In Lane	1.00		1.00	1.00		1.00	0.18		0.64	0.57		1.00
Lane Grp Cap(c), veh/h	506	1125	861	512	1125	956	381	0	0	425	0	251
V/C Ratio(X)	0.14	0.58	0.01	0.01	0.58	0.04	0.12	0.00	0.00	0.14	0.00	0.52
Avail Cap(c_a), veh/h	655	1495	1144	664	1495	1271	1283	0	0	1329	0	1177
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.9	4.1	2.7	6.3	4.1	2.7	12.2	0.0	0.0	12.3	0.0	13.0
Incr Delay (d2), s/veh	0.1	0.5	0.0	0.0	0.5	0.0	0.1	0.0	0.0	0.2	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.4	3.8	0.0	0.0	3.8	0.1	0.4	0.0	0.0	0.5	0.0	1.2
LnGrp Delay(d),s/veh	7.0	4.6	2.7	6.3	4.5	2.7	12.4	0.0	0.0	12.5	0.0	14.6
LnGrp LOS	A	A	A	A	A	A	B			B		B
Approach Vol, veh/h		735			697			44				190
Approach Delay, s/veh		4.8			4.5			12.4				14.0
Approach LOS		A			A			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.3		24.3		9.3		24.3				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		25.0		27.0		25.0		27.0				
Max Q Clear Time (g_c+I1), s		2.8		11.3		4.5		9.4				
Green Ext Time (p_c), s		1.0		9.0		1.0		9.7				
Intersection Summary												
HCM 2010 Ctrl Delay			5.9									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh 103.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	218	843	34	16	747	157	0	12	4	32	29	136
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	-	-	25	-	-	125	-	-	-	-	-	75
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	237	916	37	17	812	171	0	13	4	35	32	148

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	812	0	0	916	0	0	1847	2237	458	1786	2237	406
Stage 1	-	-	-	-	-	-	1390	1390	-	847	847	-
Stage 2	-	-	-	-	-	-	457	847	-	939	1390	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	810	-	-	740	-	-	46	42	550	51	42	594
Stage 1	-	-	-	-	-	-	150	208	-	323	376	-
Stage 2	-	-	-	-	-	-	553	376	-	284	208	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	810	-	-	740	-	-	-	15	550	~ 7	~ 15	594
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	15	-	~ 7	~ 15	-
Stage 1	-	-	-	-	-	-	56	78	-	120	356	-
Stage 2	-	-	-	-	-	-	359	356	-	88	78	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.2	0.3		\$ 1147.2
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	810	-	-	740	-	-	9	594
HCM Lane V/C Ratio	-	0.293	-	-	0.024	-	-	7.367	0.249
HCM Control Delay (s)	-	11.3	1.3	-	10	0.2	\$ 3675.7	13.1	
HCM Lane LOS	-	B	A	-	A	A	-	F	B
HCM 95th %tile Q(veh)	-	1.2	-	-	0.1	-	-	9.7	1

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	40.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	94	889	10	7	893	53	10	10	38	45	35	176
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	-	-	25	-	-	125	-	-	-	-	-	75
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	102	966	11	8	971	58	11	11	41	49	38	191










Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	971	0	0	966	0	0	1691	2157	483	1679	2157	485
Stage 1	-	-	-	-	-	-	1171	1171	-	986	986	-
Stage 2	-	-	-	-	-	-	520	986	-	693	1171	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	706	-	-	709	-	-	61	47	530	62	47	528
Stage 1	-	-	-	-	-	-	205	265	-	266	324	-
Stage 2	-	-	-	-	-	-	507	324	-	400	265	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	706	-	-	709	-	-	-	31	530	~ 31	~ 31	528
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	31	-	~ 31	~ 31	-
Stage 1	-	-	-	-	-	-	140	181	-	182	315	-
Stage 2	-	-	-	-	-	-	277	315	-	237	181	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0.2		\$ 349.9
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	706	-	-	709	-	-	31	528
HCM Lane V/C Ratio	-	0.145	-	-	0.011	-	-	2.805	0.362
HCM Control Delay (s)	-	11	0.9	-	10.1	0.1	\$ 1085.4	15.6	
HCM Lane LOS	-	B	A	-	B	A	-	F	C
HCM 95th %tile Q(veh)	-	0.5	-	-	0	-	-	10.2	1.6

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues
3: Capitol Street & Alisal St






















									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	237	916	37	17	812	171	17	67	148
v/c Ratio	0.81	0.77	0.04	0.08	0.68	0.16	0.05	0.24	0.37
Control Delay	30.0	10.9	2.5	3.8	8.6	1.3	21.6	25.2	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	10.9	2.5	3.8	8.6	1.3	21.6	25.2	8.7
Queue Length 50th (ft)	33	122	2	1	97	2	3	14	0
Queue Length 95th (ft)	#214	302	10	7	236	16	24	69	50
Internal Link Dist (ft)		292			376		126	148	
Turn Bay Length (ft)	100		25	100		125			75
Base Capacity (vph)	460	1863	1425	348	1863	1583	994	871	938
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.49	0.03	0.05	0.44	0.11	0.02	0.08	0.16

Intersection Summary










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

HCM 2010 Signalized Intersection Summary
3: Capitol Street & Alisal St

TAMC Regional ICE - Salinas
Proposed AM (2035)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	218	843	34	16	747	157	0	12	4	32	29	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1900	1900	1863	1863
Adj Flow Rate, veh/h	237	916	37	17	812	171	0	13	4	35	32	148
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	438	1470	1124	424	1470	1249	0	166	51	145	114	192
Arrive On Green	0.79	0.79	0.79	0.79	0.79	0.79	0.00	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	570	1863	1425	586	1863	1583	0	1368	421	689	939	1583
Grp Volume(v), veh/h	237	916	37	17	812	171	0	0	17	67	0	148
Grp Sat Flow(s),veh/h/ln	570	1863	1425	586	1863	1583	0	0	1788	1628	0	1583
Q Serve(g_s), s	23.7	18.2	0.5	1.1	14.5	2.3	0.0	0.0	0.8	1.3	0.0	8.1
Cycle Q Clear(g_c), s	38.3	18.2	0.5	19.3	14.5	2.3	0.0	0.0	0.8	3.1	0.0	8.1
Prop In Lane	1.00		1.00	1.00		1.00	0.00		0.24	0.52		1.00
Lane Grp Cap(c), veh/h	438	1470	1124	424	1470	1249	0	0	217	259	0	192
V/C Ratio(X)	0.54	0.62	0.03	0.04	0.55	0.14	0.00	0.00	0.08	0.26	0.00	0.77
Avail Cap(c_a), veh/h	550	1837	1405	539	1837	1561	0	0	481	492	0	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.7	3.9	2.0	7.9	3.5	2.2	0.0	0.0	34.8	35.8	0.0	38.0
Incr Delay (d2), s/veh	1.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.5	0.0	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	3.8	9.3	0.2	0.2	7.4	1.0	0.0	0.0	0.4	1.5	0.0	3.9
LnGrp Delay(d),s/veh	11.7	4.3	2.0	8.0	3.8	2.3	0.0	0.0	34.9	36.3	0.0	44.4
LnGrp LOS	B	A	A	A	A	A			C	D		D
Approach Vol, veh/h		1190			1000			17				215
Approach Delay, s/veh		5.7			3.6			34.9				41.9
Approach LOS		A			A			C				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.8		74.4		14.8		74.4				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		24.0		88.0		24.0		88.0				
Max Q Clear Time (g_c+I1), s		2.8		40.3		10.1		21.3				
Green Ext Time (p_c), s		0.9		30.1		0.8		36.4				
Intersection Summary												
HCM 2010 Ctrl Delay			8.3									
HCM 2010 LOS			A									

Queues
3: Capitol Street & Alisal St






















									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	102	966	11	8	971	58	63	87	191
v/c Ratio	0.53	0.76	0.01	0.04	0.77	0.05	0.17	0.27	0.49
Control Delay	24.0	14.6	2.1	5.1	14.8	2.6	8.7	16.7	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	14.6	2.1	5.1	14.8	2.6	8.7	16.7	15.3
Queue Length 50th (ft)	12	154	0	1	156	1	5	19	29
Queue Length 95th (ft)	#88	#461	4	5	#464	13	26	46	71
Internal Link Dist (ft)		292			376		126	148	
Turn Bay Length (ft)	100		25	100		125			75
Base Capacity (vph)	191	1266	974	195	1266	1088	982	893	982
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.76	0.01	0.04	0.77	0.05	0.06	0.10	0.19

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 3: Capitol Street & Alisal St

TAMC Regional ICE - Salinas
 Proposed PM (2035)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	94	889	10	7	893	53	10	10	38	45	35	176
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1900	1900	1863	1863
Adj Flow Rate, veh/h	102	966	11	8	971	58	11	11	41	49	38	191
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	287	1167	892	295	1167	992	121	82	196	263	167	298
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	546	1863	1425	573	1863	1583	122	437	1043	704	889	1583
Grp Volume(v), veh/h	102	966	11	8	971	58	63	0	0	87	0	191
Grp Sat Flow(s),veh/h/ln	546	1863	1425	573	1863	1583	1602	0	0	1593	0	1583
Q Serve(g_s), s	7.7	17.4	0.1	0.5	17.5	0.6	0.0	0.0	0.0	0.3	0.0	4.8
Cycle Q Clear(g_c), s	25.3	17.4	0.1	17.8	17.5	0.6	1.4	0.0	0.0	1.8	0.0	4.8
Prop In Lane	1.00		1.00	1.00		1.00	0.17		0.65	0.56		1.00
Lane Grp Cap(c), veh/h	287	1167	892	295	1167	992	400	0	0	430	0	298
V/C Ratio(X)	0.36	0.83	0.01	0.03	0.83	0.06	0.16	0.00	0.00	0.20	0.00	0.64
Avail Cap(c_a), veh/h	287	1167	892	295	1167	992	996	0	0	1030	0	918
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.2	6.3	3.0	13.2	6.3	3.1	14.8	0.0	0.0	14.9	0.0	16.2
Incr Delay (d2), s/veh	0.7	5.1	0.0	0.0	5.3	0.0	0.2	0.0	0.0	0.2	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.2	10.2	0.1	0.1	10.3	0.3	0.7	0.0	0.0	0.9	0.0	2.3
LnGrp Delay(d),s/veh	16.9	11.3	3.0	13.2	11.6	3.2	14.9	0.0	0.0	15.1	0.0	18.5
LnGrp LOS	B	B	A	B	B	A	B			B		B
Approach Vol, veh/h		1079			1037			63				278
Approach Delay, s/veh		11.8			11.1			14.9				17.4
Approach LOS		B			B			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.1		31.0		12.1		31.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		25.0		27.0		25.0		27.0				
Max Q Clear Time (g_c+I1), s		3.4		27.3		6.8		19.8				
Green Ext Time (p_c), s		1.5		0.0		1.5		6.4				
Intersection Summary												
HCM 2010 Ctrl Delay			12.2									
HCM 2010 LOS			B									

WEST ALISAL STREET AT CAPITOL STREET

Sidra Outputs

LANE SUMMARY

 Site: 2013 Proposed AM - Final

Existing AM Proposed Roundabout
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: West Capitol Street													
Lane 1 ^d	13	2.0	639	0.020	100	5.9	LOS A	0.1	2.0	Full	620	0.0	0.0
Approach	13	2.0		0.020		5.9	LOS A	0.1	2.0				
East: Alisal Street													
Lane 1 ^d	680	2.0	1204	0.565	100	9.6	LOS A	4.5	113.1	Full	575	0.0	0.0
Approach	680	2.0		0.565		9.6	LOS A	4.5	113.1				
North: West Capitol Street													
Lane 1 ^d	147	2.0	811	0.181	100	6.3	LOS A	0.8	20.0	Full	1050	0.0	0.0
Approach	147	2.0		0.181		6.3	LOS A	0.8	20.0				
West: Alisal Street													
Lane 1 ^d	803	2.0	1352	0.594	100	9.4	LOS A	5.7	144.4	Full	1200	0.0	0.0
Approach	803	2.0		0.594		9.4	LOS A	5.7	144.4				
Intersection	1643	2.0		0.594		9.2	LOS A	5.7	144.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2013 Proposed PM - Final

Existing AM Proposed Roundabout
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: West Capitol Street													
Lane 1 ^d	43	2.0	667	0.065	100	6.1	LOS A	0.3	6.5	Full	1600	0.0	0.0
Approach	43	2.0		0.065		6.1	LOS A	0.3	6.5				
East: Alisal Street													
Lane 1 ^d	698	2.0	1314	0.531	100	8.4	LOS A	4.3	110.2	Full	1600	0.0	0.0
Approach	698	2.0		0.531		8.4	LOS A	4.3	110.2				
North: West Capitol Street													
Lane 1 ^d	190	2.0	732	0.260	100	7.9	LOS A	1.1	29.2	Full	1600	0.0	0.0
Approach	190	2.0		0.260		7.9	LOS A	1.1	29.2				
West: Alisal Street													
Lane 1 ^d	734	2.0	1341	0.547	100	8.6	LOS A	4.7	119.8	Full	1600	0.0	0.0
Approach	734	2.0		0.547		8.6	LOS A	4.7	119.8				
Intersection	1665	2.0		0.547		8.4	LOS A	4.7	119.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2035 Proposed AM - Final

Existing AM Proposed Roundabout
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: West Capitol Street													
Lane 1 ^d	18	2.0	433	0.043	100	8.9	LOS A	0.2	3.9	Full	1600	0.0	0.0
Approach	18	2.0		0.043		8.9	LOS A	0.2	3.9				
East: Alisal Street													
Lane 1 ^d	1000	2.0	1112	0.899	100	27.8	LOS D	20.5	521.0	Full	1600	0.0	0.0
Approach	1000	2.0		0.899		27.8	LOS D	20.5	521.0				
North: West Capitol Street													
Lane 1 ^d	214	2.0	621	0.345	100	10.5	LOS B	1.6	40.3	Full	1600	0.0	0.0
Approach	214	2.0		0.345		10.5	LOS B	1.6	40.3				
West: Alisal Street													
Lane 1 ^d	1190	2.0	1316	0.905	100	25.5	LOS D	22.0	558.2	Full	1600	0.0	0.0
Approach	1190	2.0		0.905		25.5	LOS D	22.0	558.2				
Intersection	2423	2.0		0.905		25.0	LOS C	22.0	558.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2035 Proposed PM - Final

Existing AM Proposed Roundabout
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: West Capitol Street													
Lane 1 ^d	63	2.0	465	0.136	100	9.6	LOS A	0.5	12.8	Full	1600	0.0	0.0
Approach	63	2.0		0.136		9.6	LOS A	0.5	12.8				
East: Alisal Street													
Lane 1 ^d	1036	2.0	1264	0.820	100	18.3	LOS C	12.6	320.9	Full	1600	0.0	0.0
Approach	1036	2.0		0.820		18.3	LOS C	12.6	320.9				
North: West Capitol Street													
Lane 1 ^d	278	2.0	529	0.526	100	16.7	LOS C	2.9	72.6	Full	1600	0.0	0.0
Approach	278	2.0		0.526		16.7	LOS C	2.9	72.6				
West: Alisal Street													
Lane 1 ^d	1079	2.0	1302	0.829	100	18.6	LOS C	13.9	353.8	Full	1600	0.0	0.0
Approach	1079	2.0		0.829		18.6	LOS C	13.9	353.8				
Intersection	2457	2.0		0.829		18.0	LOS C	13.9	353.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

EAST LAUREL DRIVE AT ST. EDWARDS STREET

Capital Cost Worksheet

City of Salinas **Capital Cost Worksheet**

SAL-02 East Laurel Drive at St Edwards Street

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 687,755	\$ 1,719,620	\$ 1,031,865	\$ (113,740)	\$ 1,699,111	\$ 918,125	1.85
High	\$ 756,531	\$ 1,547,658	\$ 791,128			\$ 677,388	2.51
Low	\$ 618,980	\$ 1,891,582	\$ 1,272,603			\$ 1,158,863	1.47
Breakeven	\$ 687,755	\$ 2,500,606	\$ 1,812,851			\$ 1,699,111	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAABOUT
\$ -	\$ 1,000,000
\$ -	\$ 1,250,000
\$ -	\$ 1,500,000
\$ -	\$ 1,750,000
\$ -	\$ 2,000,000
\$ 437,149	\$ 2,250,000
\$ 687,149	\$ 2,500,000
\$ 937,149	\$ 2,750,000
\$ 1,187,149	\$ 3,000,000
\$ 1,437,149	\$ 3,250,000

Cost Sensitivity Assumptions

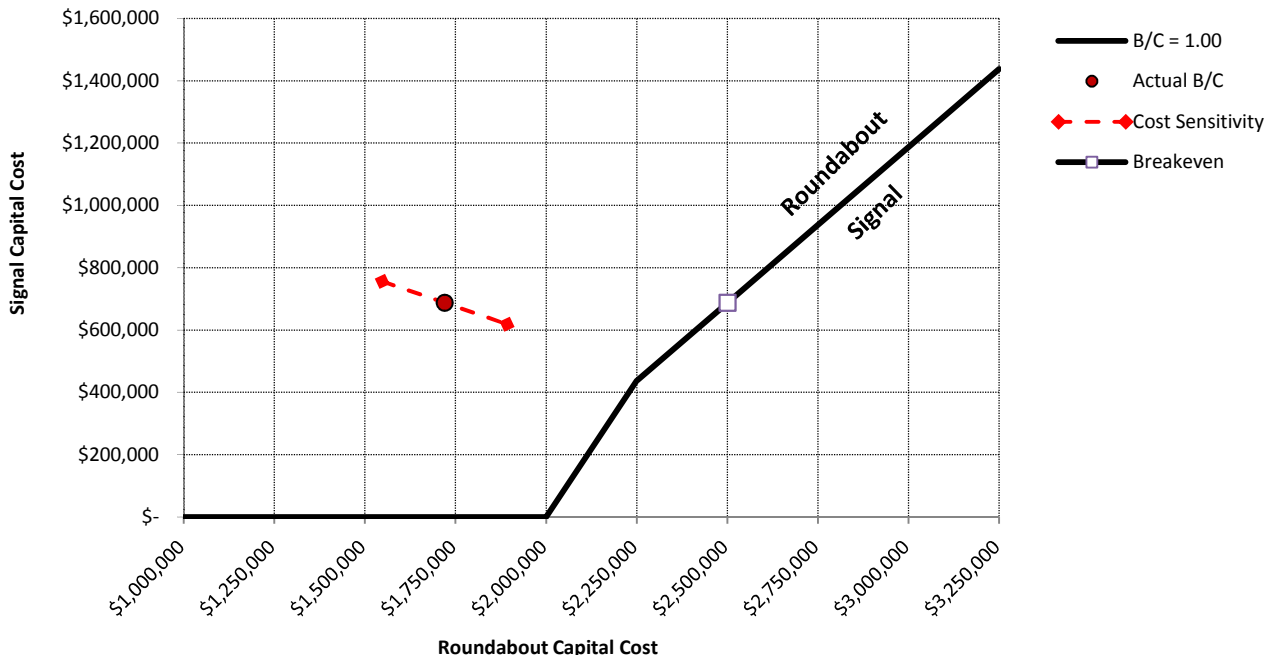
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	45%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 250,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



EAST LAUREL DRIVE AT ST. EDWARDS STREET

Turning Movement Volumes

EXISTING						
AM	NB		WB		EB	
	↶	↷	↶	↑	↑	↷
EXISTING						
Vehicles	92	37	31	703	732	70
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians	1	1				
Bicycles						

PM	NB		WB		EB	
	↶	↷	↶	↑	↑	↷
EXISTING						
Vehicles	104	33	42	877	898	134
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: City of Salinas, January 13, 2015</i>						

CUMULATIVE						
AM	NB		WB		EB	
	↶	↷	↶	↑	↑	↷
CUMULATIVE						
Vehicles	151	61	51	1153	1201	115
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						

PM	NB		WB		EB	
	↶	↷	↶	↑	↑	↷
CUMULATIVE						
Vehicles	171	54	69	1439	1473	220
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Kittelson & Associates, Inc. (2% growth rate)</i>						

EAST LAUREL DRIVE AT ST. EDWARDS STREET

Synchro Outputs

Intersection

Int Delay, s/veh 3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	732	70	31	703	92	37
Conflicting Peds, #/hr	0	0	0	0	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Stop
Storage Length	-	240	225	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	796	76	34	764	100	40

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	-	797
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	0	821
Stage 1	-	0	-
Stage 2	-	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	821
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	45.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBL	WBT
Capacity (veh/h)	159	600	-	821	-
HCM Lane V/C Ratio	0.629	0.067	-	0.041	-
HCM Control Delay (s)	59.8	11.4	-	9.6	-
HCM Lane LOS	F	B	-	A	-
HCM 95th %tile Q(veh)	3.5	0.2	-	0.1	-

Intersection

Int Delay, s/veh 12.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	898	134	42	877	104	33
Conflicting Peds, #/hr	0	0	0	0	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Stop
Storage Length	-	240	225	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	976	146	46	953	113	36

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	-	977
Stage 1	-	-	977
Stage 2	-	-	568
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	0	702
Stage 1	-	0	325
Stage 2	-	0	530
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	702
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	325
Stage 2	-	-	495

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	168.9
HCM LOS			F

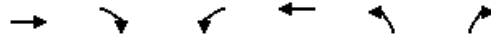
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBL	WBT
Capacity (veh/h)	98	525	-	702	-
HCM Lane V/C Ratio	1.154	0.068	-	0.065	-
HCM Control Delay (s)	218.6	12.4	-	10.5	-
HCM Lane LOS	F	B	-	B	-
HCM 95th %tile Q(veh)	7.5	0.2	-	0.2	-

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues

3: St. Edwards St & East Laurel Dr



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	796	76	34	764	100	40
v/c Ratio	0.34	0.07	0.07	0.30	0.16	0.07
Control Delay	6.3	2.8	14.6	4.2	11.9	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	2.8	14.6	4.2	11.9	6.0
Queue Length 50th (ft)	34	0	4	32	11	0
Queue Length 95th (ft)	127	18	27	66	54	17
Internal Link Dist (ft)	283			454	542	
Turn Bay Length (ft)		240	225			100
Base Capacity (vph)	2594	1180	524	3191	1576	1396
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	0.31	0.06	0.06	0.24	0.06	0.03

Intersection Summary

HCM 2010 Signalized Intersection Summary
 3: St. Edwards St & East Laurel Dr

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓		
Volume (veh/h)	732	70	31	703	92	37		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	796	76	34	764	100	40		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1600	716	72	2185	236	211		
Arrive On Green	0.45	0.45	0.04	0.62	0.13	0.13		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	796	76	34	764	100	40		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	5.1	0.9	0.6	3.4	1.7	0.7		
Cycle Q Clear(g_c), s	5.1	0.9	0.6	3.4	1.7	0.7		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1600	716	72	2185	236	211		
V/C Ratio(X)	0.50	0.11	0.47	0.35	0.42	0.19		
Avail Cap(c_a), veh/h	2095	937	332	3198	1548	1381		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	6.2	5.1	15.1	3.0	12.8	12.4		
Incr Delay (d2), s/veh	0.2	0.1	4.7	0.1	1.2	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	2.5	0.4	0.4	1.6	0.9	0.3		
LnGrp Delay(d),s/veh	6.5	5.1	19.7	3.1	14.0	12.8		
LnGrp LOS	A	A	B	A	B	B		
Approach Vol, veh/h	872			798	140			
Approach Delay, s/veh	6.3			3.8	13.6			
Approach LOS	A			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		8.3	5.3	18.5				23.8
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		28.0	6.0	19.0				29.0
Max Q Clear Time (g_c+I1), s		3.7	2.6	7.1				5.4
Green Ext Time (p_c), s		0.4	0.0	7.4				11.3
Intersection Summary								
HCM 2010 Ctrl Delay			5.8					
HCM 2010 LOS			A					

Queues

3: St. Edwards St & East Laurel Dr

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	976	146	46	953	113	36
v/c Ratio	0.41	0.13	0.12	0.36	0.22	0.08
Control Delay	8.1	2.7	17.8	4.1	15.0	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	2.7	17.8	4.1	15.0	7.1
Queue Length 50th (ft)	50	0	8	48	18	0
Queue Length 95th (ft)	168	24	35	92	60	17
Internal Link Dist (ft)	283			454	542	
Turn Bay Length (ft)		240	225			100
Base Capacity (vph)	2371	1109	410	2875	1412	1254
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	0.41	0.13	0.11	0.33	0.08	0.03
Intersection Summary						

HCM 2010 Signalized Intersection Summary
 3: St. Edwards St & East Laurel Dr

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑		
Volume (veh/h)	898	134	42	877	104	33		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	976	146	46	953	113	36		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1683	753	91	2269	232	207		
Arrive On Green	0.48	0.48	0.05	0.64	0.13	0.13		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	976	146	46	953	113	36		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	7.0	1.9	0.9	4.6	2.1	0.7		
Cycle Q Clear(g_c), s	7.0	1.9	0.9	4.6	2.1	0.7		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1683	753	91	2269	232	207		
V/C Ratio(X)	0.58	0.19	0.50	0.42	0.49	0.17		
Avail Cap(c_a), veh/h	1917	858	303	2926	1416	1264		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	6.7	5.3	16.2	3.1	14.1	13.6		
Incr Delay (d2), s/veh	0.3	0.1	4.2	0.1	1.6	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	3.5	0.8	0.5	2.2	1.1	0.3		
LnGrp Delay(d),s/veh	7.0	5.4	20.4	3.2	15.7	13.9		
LnGrp LOS	A	A	C	A	B	B		
Approach Vol, veh/h	1122			999	149			
Approach Delay, s/veh	6.8			4.0	15.3			
Approach LOS	A			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		8.6	5.8	20.7				26.5
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		28.0	6.0	19.0				29.0
Max Q Clear Time (g_c+I1), s		4.1	2.9	9.0				6.6
Green Ext Time (p_c), s		0.4	0.0	7.7				14.1
Intersection Summary								
HCM 2010 Ctrl Delay			6.1					
HCM 2010 LOS			A					

Intersection

Int Delay, s/veh 82.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1201	115	51	1153	151	61
Conflicting Peds, #/hr	0	0	0	0	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Stop
Storage Length	-	240	225	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1305	125	55	1253	164	66

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	-	1306
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	0	526
Stage 1	-	0	-
Stage 2	-	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	526
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	\$ 1014.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBL	WBT
Capacity (veh/h)	44	409	-	526	-
HCM Lane V/C Ratio	3.73	0.162	-	0.105	-
HCM Control Delay (s)	\$ 1418.6	15.5	-	12.6	-
HCM Lane LOS	F	C	-	B	-
HCM 95th %tile Q(veh)	18.4	0.6	-	0.4	-

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 246.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1473	220	69	1439	171	54
Conflicting Peds, #/hr	0	0	0	0	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Stop
Storage Length	-	240	225	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1601	239	75	1564	186	59

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	-	1602
Stage 1	-	-	1602
Stage 2	-	-	932
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	0	404
Stage 1	-	0	-
Stage 2	-	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	404
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	\$ 3510
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBL	WBT
Capacity (veh/h)	18	327	-	404	-
HCM Lane V/C Ratio	10.326	0.179	-	0.186	-
HCM Control Delay (s)	\$ 4612.6	18.4	-	15.9	-
HCM Lane LOS	F	C	-	C	-
HCM 95th %tile Q(veh)	23.9	0.6	-	0.7	-

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues

3: St. Edwards St & East Laurel Dr



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1305	125	55	1253	164	66
v/c Ratio	0.61	0.12	0.21	0.50	0.39	0.16
Control Delay	11.7	2.6	26.6	5.8	22.5	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	2.6	26.6	5.8	22.5	7.1
Queue Length 50th (ft)	170	0	18	88	51	0
Queue Length 95th (ft)	280	23	50	164	100	26
Internal Link Dist (ft)	283			454	542	
Turn Bay Length (ft)		240	225			100
Base Capacity (vph)	2312	1077	276	2817	1128	1020
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	0.56	0.12	0.20	0.44	0.15	0.06

Intersection Summary

HCM 2010 Signalized Intersection Summary
 3: St. Edwards St & East Laurel Dr

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑		
Volume (veh/h)	1201	115	51	1153	151	61		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1305	125	55	1253	164	66		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1979	886	96	2466	242	216		
Arrive On Green	0.56	0.56	0.05	0.70	0.14	0.14		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	1305	125	55	1253	164	66		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	12.4	1.8	1.5	8.0	4.2	1.8		
Cycle Q Clear(g_c), s	12.4	1.8	1.5	8.0	4.2	1.8		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1979	886	96	2466	242	216		
V/C Ratio(X)	0.66	0.14	0.57	0.51	0.68	0.31		
Avail Cap(c_a), veh/h	2138	956	222	2875	1035	923		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	7.4	5.1	22.2	3.4	19.7	18.7		
Incr Delay (d2), s/veh	0.7	0.1	5.3	0.2	3.3	0.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	6.0	0.8	0.8	3.9	2.3	0.8		
LnGrp Delay(d),s/veh	8.1	5.1	27.4	3.6	23.0	19.5		
LnGrp LOS	A	A	C	A	C	B		
Approach Vol, veh/h	1430			1308	230			
Approach Delay, s/veh	7.8			4.6	22.0			
Approach LOS	A			A	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		10.6	6.6	30.9				37.5
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		28.0	6.0	29.0				39.0
Max Q Clear Time (g_c+I1), s		6.2	3.5	14.4				10.0
Green Ext Time (p_c), s		0.7	0.0	12.5				22.0
Intersection Summary								
HCM 2010 Ctrl Delay			7.5					
HCM 2010 LOS			A					

Queues

3: St. Edwards St & East Laurel Dr



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1601	239	75	1564	186	59
v/c Ratio	0.81	0.24	0.44	0.65	0.56	0.17
Control Delay	17.7	2.3	37.3	7.8	30.0	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	2.3	37.3	7.8	30.0	7.9
Queue Length 50th (ft)	254	1	28	141	66	0
Queue Length 95th (ft)	#470	32	#72	260	121	26
Internal Link Dist (ft)	283			454	542	
Turn Bay Length (ft)		240	225			100
Base Capacity (vph)	1968	985	173	2547	811	748
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	0.81	0.24	0.43	0.61	0.23	0.08

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 3: St. Edwards St & East Laurel Dr

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑		
Volume (veh/h)	1473	220	69	1439	171	54		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1601	239	75	1564	186	59		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	2069	926	108	2533	256	229		
Arrive On Green	0.58	0.58	0.06	0.72	0.14	0.14		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	1601	239	75	1564	186	59		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	19.6	4.2	2.4	12.9	5.7	1.9		
Cycle Q Clear(g_c), s	19.6	4.2	2.4	12.9	5.7	1.9		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2069	926	108	2533	256	229		
V/C Ratio(X)	0.77	0.26	0.69	0.62	0.73	0.26		
Avail Cap(c_a), veh/h	2106	942	186	2726	869	776		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	9.0	5.8	26.3	4.1	23.4	21.7		
Incr Delay (d2), s/veh	1.8	0.1	7.7	0.4	3.9	0.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	9.9	1.8	1.4	6.2	3.1	0.9		
LnGrp Delay(d),s/veh	10.8	5.9	34.0	4.5	27.3	22.3		
LnGrp LOS	B	A	C	A	C	C		
Approach Vol, veh/h	1840			1639	245			
Approach Delay, s/veh	10.2			5.9	26.1			
Approach LOS	B			A	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		12.2	7.5	37.4				44.9
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		28.0	6.0	34.0				44.0
Max Q Clear Time (g_c+I1), s		7.7	4.4	21.6				14.9
Green Ext Time (p_c), s		0.7	0.0	11.7				26.0
Intersection Summary								
HCM 2010 Ctrl Delay			9.3					
HCM 2010 LOS			A					

EAST LAUREL DRIVE AT ST. EDWARDS STREET

Sidra Outputs

LANE SUMMARY

 Site: 2015 Proposed AM - Final

Roundabout Alternative
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: St Edwards Street													
Lane 1 ^d	140	2.0	775	0.181	100	6.6	LOS A	0.8	19.2	Full	1600	0.0	0.0
Approach	140	2.0		0.181		6.6	LOS A	0.8	19.2				
East: East Laurel Drive													
Lane 1	399	2.0	1275	0.313	100	5.7	LOS A	1.8	45.6	Full	1600	0.0	0.0
Lane 2 ^d	399	2.0	1275	0.313	100	5.7	LOS A	1.8	45.6	Full	1600	0.0	0.0
Approach	798	2.0		0.313		5.7	LOS A	1.8	45.6				
West: East Laurel Drive													
Lane 1	436	2.0	1364	0.320	100	5.5	LOS A	1.9	48.7	Full	1600	0.0	0.0
Lane 2 ^d	436	2.0	1364	0.320	100	5.5	LOS A	1.9	48.7	Full	1600	0.0	0.0
Approach	872	2.0		0.320		5.5	LOS A	1.9	48.7				
Intersection	1810	2.0		0.320		5.6	LOS A	1.9	48.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2015 Proposed PM - Final

Roundabout Alternative
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: St Edwards Street													
Lane 1 ^d	149	2.0	656	0.227	100	8.2	LOS A	0.9	23.6	Full	1600	0.0	0.0
Approach	149	2.0		0.227		8.2	LOS A	0.9	23.6				
East: East Laurel Drive													
Lane 1	499	2.0	1258	0.397	100	6.7	LOS A	2.5	63.9	Full	1350	0.0	0.0
Lane 2 ^d	499	2.0	1258	0.397	100	6.7	LOS A	2.5	63.9	Full	1350	0.0	0.0
Approach	999	2.0		0.397		6.7	LOS A	2.5	63.9				
West: East Laurel Drive													
Lane 1	561	2.0	1348	0.416	100	6.6	LOS A	2.9	72.4	Full	1600	0.0	0.0
Lane 2 ^d	561	2.0	1348	0.416	100	6.6	LOS A	2.9	72.4	Full	1600	0.0	0.0
Approach	1122	2.0		0.416		6.6	LOS A	2.9	72.4				
Intersection	2270	2.0		0.416		6.8	LOS A	2.9	72.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Monday, August 10, 2015 3:25:57 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\SAL_02_East Laurel Dr at St Edwards St
\East Laurel Drive at St Edwards Street.sip6

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2040 Proposed AM - Final

Roundabout Alternative
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: St Edwards Street													
Lane 1 ^d	230	2.0	485	0.475	100	16.3	LOS C	2.3	57.6	Full	1600	0.0	0.0
Approach	230	2.0		0.475		16.3	LOS C	2.3	57.6				
East: East Laurel Drive													
Lane 1	654	2.0	1194	0.548	100	9.3	LOS A	4.1	104.7	Full	1600	0.0	0.0
Lane 2 ^d	654	2.0	1194	0.548	100	9.3	LOS A	4.1	104.7	Full	1600	0.0	0.0
Approach	1309	2.0		0.548		9.3	LOS A	4.1	104.7				
West: East Laurel Drive													
Lane 1	715	2.0	1334	0.536	100	8.5	LOS A	4.4	112.9	Full	1600	0.0	0.0
Lane 2 ^d	715	2.0	1334	0.536	100	8.5	LOS A	4.4	112.9	Full	1600	0.0	0.0
Approach	1430	2.0		0.536		8.5	LOS A	4.4	112.9				
Intersection	2970	2.0		0.548		9.5	LOS A	4.4	112.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

Roundabout Alternative
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: St Edwards Street													
Lane 1 ^d	245	2.0	370	0.661	100	30.1	LOS D	3.5	87.8	Full	1600	0.0	0.0
Approach	245	2.0		0.661		30.1	LOS D	3.5	87.8				
East: East Laurel Drive													
Lane 1	820	2.0	1168	0.702	100	13.5	LOS B	7.4	187.0	Full	1600	0.0	0.0
Lane 2 ^d	820	2.0	1168	0.702	100	13.5	LOS B	7.4	187.0	Full	1600	0.0	0.0
Approach	1639	2.0		0.702		13.5	LOS B	7.4	187.0				
West: East Laurel Drive													
Lane 1	920	2.0	1308	0.704	100	12.5	LOS B	8.1	206.0	Full	1600	0.0	0.0
Lane 2 ^d	920	2.0	1308	0.704	100	12.5	LOS B	8.1	206.0	Full	1600	0.0	0.0
Approach	1840	2.0		0.704		12.5	LOS B	8.1	206.0				
Intersection	3724	2.0		0.704		14.1	LOS B	8.1	206.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

SHERWOOD DRIVE AT SHERWOOD PLACE

Capital Cost Worksheet

City of Salinas **Capital Cost Worksheet**

SAL-03 Sherwood Drive at Sherwood Place

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 494,545	\$ 2,306,045	\$ 1,811,500	\$ (91,264)	\$ 756,009	\$ 1,720,236	0.44
High	\$ 544,000	\$ 2,075,441	\$ 1,531,441			\$ 1,440,177	0.52
Low	\$ 445,091	\$ 2,536,650	\$ 2,091,559			\$ 2,000,295	0.38
Breakeven	\$ 494,545	\$ 1,341,818	\$ 847,273			\$ 756,009	1.00
Custom 1							
Custom 2							

**Capital Cost Relationship
(B/C=1.00)**

SIGNAL	ROUNDAABOUT
\$ -	\$ 1,000,000
\$ 402,727	\$ 1,250,000
\$ 652,727	\$ 1,500,000
\$ 902,727	\$ 1,750,000
\$ 1,152,727	\$ 2,000,000
\$ 1,402,727	\$ 2,250,000
\$ 1,652,727	\$ 2,500,000
\$ 1,902,727	\$ 2,750,000
\$ 2,152,727	\$ 3,000,000
\$ 2,402,727	\$ 3,250,000

Cost Sensitivity Assumptions

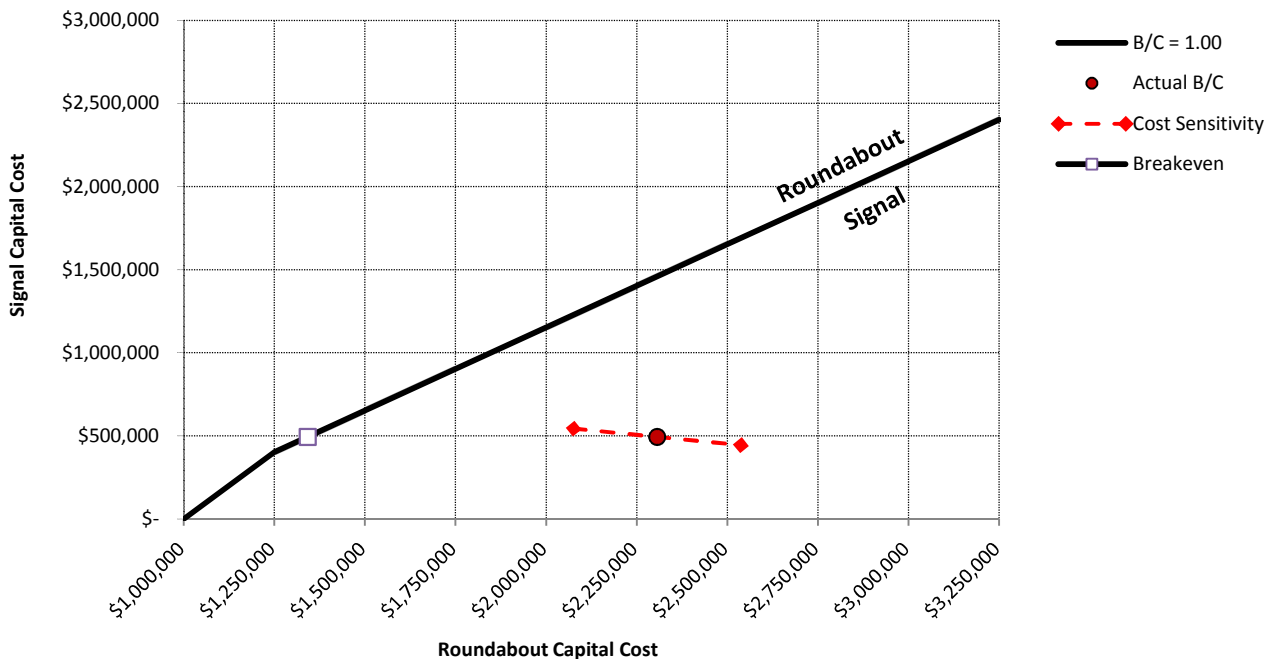
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	-42%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 250,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



SHERWOOD DRIVE AT SHERWOOD PLACE

Turning Movement Volumes

EXISTING						
AM	NB		WB		SB	
	↑	↗	↖	↘	↖	↑
EXISTING						
Vehicles	765	100	34	108	181	1219
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						

PM	NB		WB		SB	
	↑	↗	↖	↘	↖	↑
EXISTING						
Vehicles	1437	54	16	28	120	745
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Haciendas Phase 3/4 TIA (April 8, 2014), 2014</i>						

CUMULATIVE						
AM	NB		WB		SB	
	↑	↗	↖	↘	↖	↑
CUMULATIVE						
Vehicles	1187	100	34	108	181	1876
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	4%	2%	2%	2%	2%
Pedestrians						
Bicycles						

PM	NB		WB		SB	
	↑	↗	↖	↘	↖	↑
CUMULATIVE						
Vehicles	2112	54	16	28	120	1161
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Haciendas Phase 3/4 TIA (April 8, 2014), 2030</i>						

SHERWOOD DRIVE AT SHERWOOD PLACE

Synchro Outputs

Intersection

Int Delay, s/veh 1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	34	108	765	100	181	1219
Conflicting Peds, #/hr	8	4	0	8	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	480	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	117	832	109	197	1325

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1896	425	0 0 840 0
Stage 1	840	-	- - - -
Stage 2	1056	-	- - - -
Critical Hdwy	6.84	6.94	- - 4.14 -
Critical Hdwy Stg 1	5.84	-	- - - -
Critical Hdwy Stg 2	5.84	-	- - - -
Follow-up Hdwy	3.52	3.32	- - 2.22 -
Pot Cap-1 Maneuver	61	578	- - 791 -
Stage 1	384	-	- - - -
Stage 2	296	-	- - - -
Platoon blocked, %			- - -
Mov Cap-1 Maneuver	45	574	- - 790 -
Mov Cap-2 Maneuver	147	-	- - - -
Stage 1	381	-	- - - -
Stage 2	221	-	- - - -

Approach	WB	NB	SB
HCM Control Delay, s	18.8	0	1.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	147	574	790	-
HCM Lane V/C Ratio	-	-	0.251	0.205	0.249	-
HCM Control Delay (s)	-	-	37.5	12.9	11.1	-
HCM Lane LOS	-	-	E	B	B	-
HCM 95th %tile Q(veh)	-	-	0.9	0.8	1	-

Intersection

Int Delay, s/veh 1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	16	28	1437	54	120	745
Conflicting Peds, #/hr	8	4	0	8	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	480	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	30	1562	59	130	810







Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	2236	790	0
Stage 1	1570	-	-
Stage 2	666	-	-
Critical Hdwy	6.84	6.94	4.14
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.22
Pot Cap-1 Maneuver	36	333	416
Stage 1	157	-	-
Stage 2	472	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	24	331	416
Mov Cap-2 Maneuver	105	-	-
Stage 1	156	-	-
Stage 2	322	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27.5	0	2.4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	105	331	416	-
HCM Lane V/C Ratio	-	-	0.166	0.092	0.314	-
HCM Control Delay (s)	-	-	46	17	17.6	-
HCM Lane LOS	-	-	E	C	C	-
HCM 95th %tile Q(veh)	-	-	0.6	0.3	1.3	-

Queues















4: Sherwood Pl & Sherwood Dr

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	37	117	832	109	197	1325
v/c Ratio	0.11	0.31	0.61	0.17	0.65	0.53
Control Delay	15.6	6.8	12.0	3.1	32.4	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	6.8	12.0	3.1	32.4	5.0
Queue Length 50th (ft)	7	0	72	0	41	64
Queue Length 95th (ft)	25	30	124	20	#138	122
Internal Link Dist (ft)	654		891			877
Turn Bay Length (ft)		50		480	200	
Base Capacity (vph)	1199	1094	1828	843	304	2678
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	0.03	0.11	0.46	0.13	0.65	0.49

Intersection Summary

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







HCM 2010 Signalized Intersection Summary
 4: Sherwood Pl & Sherwood Dr

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations			 			 		
Volume (veh/h)	34	108	765	100	181	1219		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.99	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	37	117	832	109	197	1325		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	192	171	1537	681	248	2407		
Arrive On Green	0.11	0.11	0.43	0.43	0.14	0.68		
Sat Flow, veh/h	1774	1583	3632	1569	1774	3632		
Grp Volume(v), veh/h	37	117	832	109	197	1325		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1569	1774	1770		
Q Serve(g_s), s	0.7	2.7	6.6	1.6	4.1	7.2		
Cycle Q Clear(g_c), s	0.7	2.7	6.6	1.6	4.1	7.2		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	192	171	1537	681	248	2407		
V/C Ratio(X)	0.19	0.68	0.54	0.16	0.79	0.55		
Avail Cap(c_a), veh/h	1126	1005	1685	747	281	2621		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	15.4	16.2	7.9	6.5	15.7	3.1		
Incr Delay (d2), s/veh	0.5	4.7	0.3	0.1	12.9	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.4	1.4	3.2	0.7	2.9	3.4		
LnGrp Delay(d),s/veh	15.8	21.0	8.2	6.6	28.6	3.3		
LnGrp LOS	B	C	A	A	C	A		
Approach Vol, veh/h	154		941			1522		
Approach Delay, s/veh	19.7		8.0			6.6		
Approach LOS	B		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.3	20.4				29.7		8.1
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	6.0	18.0				28.0		24.0
Max Q Clear Time (g_c+I1), s	6.1	8.6				9.2		4.7
Green Ext Time (p_c), s	0.0	7.8				13.7		0.4
Intersection Summary								
HCM 2010 Ctrl Delay			7.9					
HCM 2010 LOS			A					

Queues

4: Sherwood Pl & Sherwood Dr

Proposed PM (2014)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	17	30	1562	59	130	810
v/c Ratio	0.08	0.13	0.76	0.06	0.50	0.27
Control Delay	25.6	12.6	11.6	2.1	34.0	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	12.6	11.6	2.1	34.0	1.9
Queue Length 50th (ft)	5	0	194	0	44	31
Queue Length 95th (ft)	22	21	287	12	#120	50
Internal Link Dist (ft)	654		891			877
Turn Bay Length (ft)		50		480	200	
Base Capacity (vph)	893	801	2694	1174	260	3101
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	0.02	0.04	0.58	0.05	0.50	0.26













Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary
4: Sherwood Pl & Sherwood Dr

TAMC Regional ICE - Salinas
Proposed PM (2014)

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Volume (veh/h)	16	28	1437	54	120	745		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.99	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	17	30	1562	59	130	810		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	84	75	2222	988	166	2826		
Arrive On Green	0.05	0.05	0.63	0.63	0.09	0.80		
Sat Flow, veh/h	1774	1583	3632	1573	1774	3632		
Grp Volume(v), veh/h	17	30	1562	59	130	810		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1573	1774	1770		
Q Serve(g_s), s	0.5	1.0	15.3	0.8	3.7	3.1		
Cycle Q Clear(g_c), s	0.5	1.0	15.3	0.8	3.7	3.1		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	84	75	2222	988	166	2826		
V/C Ratio(X)	0.20	0.40	0.70	0.06	0.78	0.29		
Avail Cap(c_a), veh/h	820	732	2521	1121	239	3271		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	23.8	24.0	6.4	3.7	23.0	1.4		
Incr Delay (d2), s/veh	1.2	3.4	0.8	0.0	10.0	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.3	0.5	7.4	0.3	2.3	1.5		
LnGrp Delay(d),s/veh	25.0	27.4	7.2	3.8	33.0	1.4		
LnGrp LOS	C	C	A	A	C	A		
Approach Vol, veh/h	47		1621			940		
Approach Delay, s/veh	26.5		7.1			5.8		
Approach LOS	C		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.9	36.6				45.5		6.5
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	7.0	37.0				48.0		24.0
Max Q Clear Time (g_c+I1), s	5.7	17.3				5.1		3.0
Green Ext Time (p_c), s	0.0	15.3				26.7		0.1
Intersection Summary								
HCM 2010 Ctrl Delay			7.0					
HCM 2010 LOS			A					

Intersection

Int Delay, s/veh 2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	34	108	1187	100	181	1876
Conflicting Peds, #/hr	8	4	0	8	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	480	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	117	1290	109	197	2039

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	2711	654	0 0 1298 0
Stage 1	1298	-	- - - -
Stage 2	1413	-	- - - -
Critical Hdwy	6.84	6.94	- - 4.14 -
Critical Hdwy Stg 1	5.84	-	- - - -
Critical Hdwy Stg 2	5.84	-	- - - -
Follow-up Hdwy	3.52	3.32	- - 2.22 -
Pot Cap-1 Maneuver	~ 17	409	- - 530 -
Stage 1	220	-	- - - -
Stage 2	191	-	- - - -
Platoon blocked, %			- - - -
Mov Cap-1 Maneuver	~ 11	406	- - 530 -
Mov Cap-2 Maneuver	75	-	- - - -
Stage 1	219	-	- - - -
Stage 2	119	-	- - - -

Approach	WB	NB	SB
HCM Control Delay, s	35.4	0	1.4
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	75	406	530	-
HCM Lane V/C Ratio	-	-	0.493	0.289	0.371	-
HCM Control Delay (s)	-	-	92.7	17.4	15.7	-
HCM Lane LOS	-	-	F	C	C	-
HCM 95th %tile Q(veh)	-	-	2	1.2	1.7	-

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	16	28	2112	54	120	1161
Conflicting Peds, #/hr	8	4	0	8	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	480	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	30	2296	59	130	1262

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	3196	1157	0	0	2304	0
Stage 1	2304	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 8	190	-	-	215	-
Stage 1	61	-	-	-	-	-
Stage 2	361	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	~ 3	189	-	-	215	-
Mov Cap-2 Maneuver	40	-	-	-	-	-
Stage 1	61	-	-	-	-	-
Stage 2	142	-	-	-	-	-

Approach	WB	WB	NB	SB
HCM Control Delay, s	72.8		0	4.2
HCM LOS	F			







Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	40	189	215	-
HCM Lane V/C Ratio	-	-	0.435	0.161	0.607	-
HCM Control Delay (s)	-	-	151.6	27.7	44.6	-
HCM Lane LOS	-	-	F	D	E	-
HCM 95th %tile Q(veh)	-	-	1.5	0.6	3.5	-

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues

4: Sherwood Pl & Sherwood Dr













						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	37	117	1290	109	197	2039
v/c Ratio	0.15	0.37	0.77	0.14	0.54	0.73
Control Delay	25.4	9.9	15.7	2.6	29.4	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	9.9	15.7	2.6	29.4	6.4
Queue Length 50th (ft)	11	0	176	0	60	153
Queue Length 95th (ft)	37	40	268	20	#156	287
Internal Link Dist (ft)	654		891			877
Turn Bay Length (ft)		50		480	200	
Base Capacity (vph)	864	820	2328	1039	396	3064
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	0.04	0.14	0.55	0.10	0.50	0.67

Intersection Summary







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

HCM 2010 Signalized Intersection Summary
4: Sherwood Pl & Sherwood Dr

TAMC Regional ICE - Salinas
Proposed AM (2030)

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Volume (veh/h)	34	108	1187	100	181	1876		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.99	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	37	117	1290	109	197	2039		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	183	163	1976	878	245	2700		
Arrive On Green	0.10	0.10	0.56	0.56	0.14	0.76		
Sat Flow, veh/h	1774	1583	3632	1572	1774	3632		
Grp Volume(v), veh/h	37	117	1290	109	197	2039		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1572	1774	1770		
Q Serve(g_s), s	1.1	4.3	15.1	2.0	6.4	19.2		
Cycle Q Clear(g_c), s	1.1	4.3	15.1	2.0	6.4	19.2		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	183	163	1976	878	245	2700		
V/C Ratio(X)	0.20	0.72	0.65	0.12	0.81	0.76		
Avail Cap(c_a), veh/h	713	636	1976	878	327	2843		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	24.5	25.9	9.2	6.3	25.0	4.0		
Incr Delay (d2), s/veh	0.5	5.8	0.8	0.1	10.3	1.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.6	2.1	7.4	0.9	3.8	9.5		
LnGrp Delay(d),s/veh	25.1	31.7	10.0	6.3	35.3	5.1		
LnGrp LOS	C	C	A	A	D	A		
Approach Vol, veh/h	154		1399			2236		
Approach Delay, s/veh	30.1		9.7			7.8		
Approach LOS	C		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.2	37.4				49.6		10.2
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	11.0	33.0				48.0		24.0
Max Q Clear Time (g_c+I1), s	8.4	17.1				21.2		6.3
Green Ext Time (p_c), s	0.1	15.0				24.3		0.4
Intersection Summary								
HCM 2010 Ctrl Delay			9.4					
HCM 2010 LOS			A					

Queues
4: Sherwood Pl & Sherwood Dr













						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	17	30	2296	59	130	1262
v/c Ratio	0.14	0.23	0.85	0.05	0.79	0.39
Control Delay	47.8	20.5	13.6	1.2	78.1	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	20.5	13.6	1.2	78.1	1.6
Queue Length 50th (ft)	11	0	512	0	85	60
Queue Length 95th (ft)	33	29	705	10	#194	90
Internal Link Dist (ft)	654		891			877
Turn Bay Length (ft)		50		480	200	
Base Capacity (vph)	437	406	2733	1179	164	3226
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	0.04	0.07	0.84	0.05	0.79	0.39

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
4: Sherwood Pl & Sherwood Dr

TAMC Regional ICE - Salinas
Proposed PM (2030)

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Volume (veh/h)	16	28	2112	54	120	1161		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.99	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	17	30	2296	59	130	1262		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	65	58	2656	1182	159	3119		
Arrive On Green	0.04	0.04	0.75	0.75	0.09	0.88		
Sat Flow, veh/h	1774	1583	3632	1575	1774	3632		
Grp Volume(v), veh/h	17	30	2296	59	130	1262		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1575	1774	1770		
Q Serve(g_s), s	0.9	1.8	45.0	0.9	7.0	6.4		
Cycle Q Clear(g_c), s	0.9	1.8	45.0	0.9	7.0	6.4		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	65	58	2656	1182	159	3119		
V/C Ratio(X)	0.26	0.51	0.86	0.05	0.82	0.40		
Avail Cap(c_a), veh/h	436	389	2717	1209	163	3188		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	45.8	46.2	8.7	3.2	43.7	1.1		
Incr Delay (d2), s/veh	2.1	6.8	3.1	0.0	26.0	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.5	0.9	22.5	0.4	4.6	3.0		
LnGrp Delay(d),s/veh	47.8	53.0	11.8	3.2	69.7	1.2		
LnGrp LOS	D	D	B	A	E	A		
Approach Vol, veh/h	47		2355			1392		
Approach Delay, s/veh	51.1		11.5			7.6		
Approach LOS	D		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.8	77.3				90.1		7.6
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	9.0	75.0				88.0		24.0
Max Q Clear Time (g_c+I1), s	9.0	47.0				8.4		3.8
Green Ext Time (p_c), s	0.0	26.3				67.8		0.1
Intersection Summary								
HCM 2010 Ctrl Delay			10.6					
HCM 2010 LOS			B					

SHERWOOD DRIVE AT SHERWOOD PLACE

Sidra Outputs

LANE SUMMARY

 Site: 2014 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Sherwood Drive													
Lane 1	470	2.0	1174	0.400	100	7.1	LOS A	2.5	62.5	Full	1600	0.0	0.0
Lane 2 ^d	470	2.0	1174	0.400	100	7.1	LOS A	2.5	62.5	Full	1600	0.0	0.0
Approach	940	2.0		0.400		7.1	LOS A	2.5	62.5				
East: Sherwood Place													
Lane 1	37	2.0	706	0.052	100	5.6	LOS A	0.2	5.6	Full	1600	0.0	0.0
Lane 2 ^d	117	2.0	768	0.153	100	6.3	LOS A	0.6	16.1	Short	100	0.0	0.0
Approach	154	2.0		0.153		6.1	LOS A	0.6	16.1				
North: Sherwood Drive													
Lane 1	761	2.0	1379	0.552	100	8.5	LOS A	5.0	126.1	Full	1600	0.0	0.0
Lane 2 ^d	761	2.0	1379	0.552	100	8.5	LOS A	5.0	126.1	Full	1600	0.0	0.0
Approach	1522	2.0		0.552		8.5	LOS A	5.0	126.1				
Intersection	2616	2.0		0.552		7.9	LOS A	5.0	126.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2014 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Sherwood Drive													
Lane 1	810	2.0	1255	0.645	100	11.2	LOS B	6.2	156.8	Full	1600	0.0	0.0
Lane 2 ^d	810	2.0	1255	0.645	100	11.2	LOS B	6.2	156.8	Full	1600	0.0	0.0
Approach	1621	2.0		0.645		11.2	LOS B	6.2	156.8				
East: Sherwood Place													
Lane 1	17	2.0	339	0.051	100	11.5	LOS B	0.2	4.8	Full	650	0.0	0.0
Lane 2 ^d	30	2.0	396	0.077	100	10.2	LOS B	0.3	6.9	Short	100	0.0	0.0
Approach	48	2.0		0.077		10.7	LOS B	0.3	6.9				
North: Sherwood Drive													
Lane 1	470	2.0	1407	0.334	100	5.5	LOS A	2.1	53.7	Full	1600	0.0	0.0
Lane 2 ^d	470	2.0	1407	0.334	100	5.5	LOS A	2.1	53.7	Full	1600	0.0	0.0
Approach	940	2.0		0.334		5.5	LOS A	2.1	53.7				
Intersection	2609	2.0		0.645		9.1	LOS A	6.2	156.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Monday, August 10, 2015 4:29:29 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\SAL_03_Sherwood Dr at Sherwood Pl
\Sherwood Drive at Sherwood Place.sip6

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2030 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Sherwood Drive													
Lane 1	674	2.0	1174	0.574	100	10.0	LOS A	4.5	113.6	Full	1600	0.0	0.0
Lane 2 ^d	674	2.0	1174	0.574	100	10.0	LOS A	4.5	113.6	Full	1600	0.0	0.0
Approach	1349	2.0		0.574		10.0	LOS A	4.5	113.6				
East: Sherwood Place													
Lane 1	37	2.0	445	0.083	100	9.2	LOS A	0.3	8.2	Full	1600	0.0	0.0
Lane 2 ^d	117	2.0	507	0.232	100	10.4	LOS B	0.9	22.8	Short	100	0.0	0.0
Approach	154	2.0		0.232		10.1	LOS B	0.9	22.8				
North: Sherwood Drive													
Lane 1	1118	2.0	1379	0.811	100	16.7	LOS C	15.4	390.8	Full	1600	0.0	0.0
Lane 2 ^d	1118	2.0	1379	0.811	100	16.7	LOS C	15.4	390.8	Full	1600	0.0	0.0
Approach	2236	2.0		0.811		16.7	LOS C	15.4	390.8				
Intersection	3739	2.0		0.811		14.0	LOS B	15.4	390.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2030 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Sherwood Drive													
Lane 1	1177	2.0	1255	0.938	100	31.0	LOS D	29.4	747.4	Full	1600	0.0	0.0
Lane 2 ^d	1177	2.0	1255	0.938	100	31.0	LOS D	29.4	747.4	Full	1600	0.0	0.0
Approach	2354	2.0		0.938		31.0	LOS D	29.4	747.4				
East: Sherwood Place													
Lane 1	17	2.0	162	0.107	100	25.4	LOS D	0.4	8.9	Full	1600	0.0	0.0
Lane 2 ^d	30	2.0	204	0.149	100	21.5	LOS C	0.5	12.1	Short	100	0.0	0.0
Approach	48	2.0		0.149		22.9	LOS C	0.5	12.1				
North: Sherwood Drive													
Lane 1	696	2.0	1407	0.495	100	7.5	LOS A	4.1	103.6	Full	1600	0.0	0.0
Lane 2 ^d	696	2.0	1407	0.495	100	7.5	LOS A	4.1	103.6	Full	1600	0.0	0.0
Approach	1392	2.0		0.495		7.5	LOS A	4.1	103.6				
Intersection	3795	2.0		0.938		22.3	LOS C	29.4	747.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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 \Sherwood Drive at Sherwood Place.sip6

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INTERSECTION 6**

Regional Intersection Control Evaluation
Section 9:

Sand City

Appendix B9: Analysis Worksheets

Study Intersections:

- TIOGA AVENUE AT CALIFORNIA AVENUE
- TIOGA AVENUE AT DEL MONTE BOULEVARD



TIOGA AVENUE AT CALIFORNIA AVENUE

Capital Cost Worksheet

City of Sand City

SCY_01 Tioga Avenue at California Avenue

Capital Cost Worksheet

01/16

B/C Target	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
	SIGNAL (a)	ROUNDAOBT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 509,500	\$ 1,275,675	\$ 766,175	\$ (115,983)	\$ 863,934	\$ 650,192	1.33
High	\$ 560,450	\$ 1,148,108	\$ 587,658			\$ 471,675	1.83
Low	\$ 458,550	\$ 1,403,243	\$ 944,693			\$ 828,710	1.04
Breakeven	\$ 509,500	\$ 1,489,417	\$ 979,917			\$ 863,934	1.00
Custom 1							
Custom 2							

Capital Cost Relationship (B/C=1.00)

SIGNAL	ROUNDAOBT
\$ -	\$ 600,000
\$ -	\$ 800,000
\$ -	\$ 1,000,000
\$ -	\$ 1,200,000
\$ 420,083	\$ 1,400,000
\$ 620,083	\$ 1,600,000
\$ 820,083	\$ 1,800,000
\$ 1,020,083	\$ 2,000,000
\$ 1,220,083	\$ 2,200,000
\$ 1,420,083	\$ 2,400,000

Cost Sensitivity Assumptions

B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	17%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase \$ 200,000 (x axis major unit)

Min Signal Cost \$ 400,000 (Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS

The graph plots Signal Capital Cost on the y-axis (ranging from \$0 to \$1,600,000) against Roundabout Capital Cost on the x-axis (ranging from \$600,000 to \$2,400,000). A solid black line represents the B/C = 1.00 relationship. A red dot indicates the Actual B/C point. A red dashed line with diamond markers shows the Cost Sensitivity range. A purple square marks the Breakeven point where the B/C = 1.00 line intersects the Actual B/C point.

- B/C = 1.00
- Actual B/C
- ◆ - - - Cost Sensitivity
- Breakeven

TIOGA AVENUE AT CALIFORNIA AVENUE

Turning Movement Volumes

EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	11	15	55	66	35	27	19	43	8	1	42	3
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	12	26	74	34	49	499	166	15	64	34	55	7
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
<i>Source: Fehr and Peers Study (January 2012), 2012</i>												

CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	19	26	96	115	61	47	33	75	14	2	73	5
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck %	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	21	45	129	59	85	574	289	26	111	59	96	12
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
<i>Source: Kittelson & Associates, Inc. (2% growth rate)</i>												

TIOGA AVENUE AT CALIFORNIA AVENUE

Synchro Outputs

Intersection

Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	1	42	3	0	66	35	27	0	11	15	55
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	0	1	46	3	0	72	38	29	0	12	16	60
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	2	2
HCM Control Delay	8.1	8.4	8.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	14%	100%	0%	100%	0%	100%	0%
Vol Thru, %	19%	0%	93%	0%	56%	0%	84%
Vol Right, %	68%	0%	7%	0%	44%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	81	1	45	66	62	19	51
LT Vol	11	1	0	66	0	19	0
Through Vol	15	0	42	0	35	0	43
RT Vol	55	0	3	0	27	0	8
Lane Flow Rate	88	1	49	72	67	21	55
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.116	0.002	0.068	0.11	0.088	0.032	0.077
Departure Headway (Hd)	4.725	5.583	5.034	5.495	4.687	5.594	4.982
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	760	642	713	654	766	642	721
Service Time	2.744	3.306	2.757	3.214	2.406	3.314	2.702
HCM Lane V/C Ratio	0.116	0.002	0.069	0.11	0.087	0.033	0.076
HCM Control Delay	8.4	8.3	8.1	8.9	7.9	8.5	8.1
HCM Lane LOS	A	A	A	A	A	A	A
HCM 95th-tile Q	0.4	0	0.2	0.4	0.3	0.1	0.2

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	19	43	8
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	21	47	9
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach NB

Opposing Lanes 1

Conflicting Approach Left WB

Conflicting Lanes Left 2

Conflicting Approach Right EB

Conflicting Lanes Right 2

HCM Control Delay 8.2

HCM LOS A

Lane

Intersection

Intersection Delay, s/veh	24.3
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	34	55	7	0	34	49	499	0	12	26	74
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	0	37	60	8	0	37	53	542	0	13	28	80
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	2	2
HCM Control Delay	10.5	33.8	11.8
HCM LOS	B	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	11%	100%	0%	100%	0%	100%	0%
Vol Thru, %	23%	0%	89%	0%	9%	0%	19%
Vol Right, %	66%	0%	11%	0%	91%	0%	81%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	112	34	62	34	548	166	79
LT Vol	12	34	0	34	0	166	0
Through Vol	26	0	55	0	49	0	15
RT Vol	74	0	7	0	499	0	64
Lane Flow Rate	122	37	67	37	596	180	86
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.228	0.074	0.124	0.067	0.885	0.365	0.148
Departure Headway (Hd)	6.73	7.236	6.644	6.498	5.346	7.291	6.207
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	530	492	536	550	673	491	574
Service Time	4.816	5.025	4.433	4.255	3.102	5.066	3.981
HCM Lane V/C Ratio	0.23	0.075	0.125	0.067	0.886	0.367	0.15
HCM Control Delay	11.8	10.6	10.4	9.7	35.3	14.2	10.1
HCM Lane LOS	B	B	B	A	E	B	B
HCM 95th-tile Q	0.9	0.2	0.4	0.2	10.8	1.7	0.5

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	166	15	64
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	180	16	70
Number of Lanes	0	1	1	0

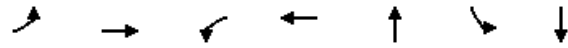
Approach SB

Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	12.9
HCM LOS	B

Lane

Queues

1: California Avenue & Tioga Avenue























Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	1	49	72	67	88	21	56
v/c Ratio	0.00	0.06	0.11	0.08	0.12	0.04	0.07
Control Delay	10.0	10.2	10.5	6.2	6.6	13.5	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	10.2	10.5	6.2	6.6	13.5	12.0
Queue Length 50th (ft)	0	11	18	10	8	6	13
Queue Length 95th (ft)	3	28	39	27	33	18	33
Internal Link Dist (ft)		369		206	566		298
Turn Bay Length (ft)	85		75			60	
Base Capacity (vph)	637	887	648	851	716	578	756
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.06	0.11	0.08	0.12	0.04	0.07

Intersection Summary

HCM 2010 Signalized Intersection Summary








1: California Avenue & Tioga Avenue

TAMC Regional ICE - Sand City
Proposed AM (2012)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	42	3	66	35	27	11	15	55	19	43	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	1	46	3	72	38	29	12	16	60	21	47	9
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	706	830	54	725	471	360	111	156	455	656	628	120
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1329	1730	113	1351	982	749	137	377	1101	1318	1520	291
Grp Volume(v), veh/h	1	0	49	72	0	67	88	0	0	21	0	56
Grp Sat Flow(s),veh/h/ln	1329	0	1843	1351	0	1731	1615	0	0	1318	0	1811
Q Serve(g_s), s	0.0	0.0	1.1	2.3	0.0	1.6	0.0	0.0	0.0	0.0	0.0	1.4
Cycle Q Clear(g_c), s	1.6	0.0	1.1	3.3	0.0	1.6	2.5	0.0	0.0	0.5	0.0	1.4
Prop In Lane	1.00		0.06	1.00		0.43	0.14		0.68	1.00		0.16
Lane Grp Cap(c), veh/h	706	0	885	725	0	831	722	0	0	656	0	749
V/C Ratio(X)	0.00	0.00	0.06	0.10	0.00	0.08	0.12	0.00	0.00	0.03	0.00	0.07
Avail Cap(c_a), veh/h	706	0	885	725	0	831	722	0	0	656	0	749
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(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.0	0.0	10.4	11.3	0.0	10.5	13.6	0.0	0.0	13.1	0.0	13.3
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.3	0.0	0.2	0.3	0.0	0.0	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.6	0.9	0.0	0.8	1.2	0.0	0.0	0.3	0.0	0.7
LnGrp Delay(d),s/veh	11.0	0.0	10.5	11.6	0.0	10.7	14.0	0.0	0.0	13.2	0.0	13.5
LnGrp LOS	B		B	B		B	B			B		B
Approach Vol, veh/h		50			139			88				77
Approach Delay, s/veh		10.5			11.2			14.0				13.4
Approach LOS		B			B			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.0		40.0		35.0		40.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		31.0		36.0		31.0		36.0				
Max Q Clear Time (g_c+I1), s		4.5		3.6		3.4		5.3				
Green Ext Time (p_c), s		0.9		0.9		0.9		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			12.3									
HCM 2010 LOS			B									

Queues

1: California Avenue & Tioga Avenue

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	37	68	37	595	121	180	86
v/c Ratio	0.11	0.06	0.05	0.52	0.21	0.44	0.15
Control Delay	8.3	6.7	3.4	3.3	8.8	24.3	7.5
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Total Delay	8.3	6.7	3.4	3.8	8.8	24.3	7.5
Queue Length 50th (ft)	7	11	2	21	13	65	5
Queue Length 95th (ft)	20	27	m5	m39	48	122	34
Internal Link Dist (ft)		369		206	566		298
Turn Bay Length (ft)	85		75			60	
Base Capacity (vph)	340	1052	761	1153	584	410	570
Starvation Cap Reductn	0	0	0	213	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.06	0.05	0.63	0.21	0.44	0.15

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 1: California Avenue & Tioga Avenue

TAMC Regional ICE - Sand City
 Proposed PM (2012)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	34	55	7	34	49	499	12	26	74	166	15	64
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	37	60	8	37	53	542	13	28	80	180	16	70
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	360	923	123	835	82	838	80	151	346	528	97	424
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	819	1610	215	1328	143	1462	83	471	1082	1280	303	1326
Grp Volume(v), veh/h	37	0	68	37	0	595	121	0	0	180	0	86
Grp Sat Flow(s),veh/h/ln	819	0	1825	1328	0	1605	1636	0	0	1280	0	1629
Q Serve(g_s), s	2.4	0.0	1.2	1.0	0.0	18.9	0.0	0.0	0.0	2.9	0.0	2.8
Cycle Q Clear(g_c), s	21.3	0.0	1.2	2.2	0.0	18.9	4.0	0.0	0.0	6.9	0.0	2.8
Prop In Lane	1.00		0.12	1.00		0.91	0.11		0.66	1.00		0.81
Lane Grp Cap(c), veh/h	360	0	1046	835	0	920	577	0	0	528	0	521
V/C Ratio(X)	0.10	0.00	0.06	0.04	0.00	0.65	0.21	0.00	0.00	0.34	0.00	0.16
Avail Cap(c_a), veh/h	360	0	1046	835	0	920	577	0	0	528	0	521
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	0.66	0.00	0.66	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.1	0.0	7.1	7.6	0.0	10.8	18.7	0.0	0.0	19.5	0.0	18.3
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.1	0.0	2.3	0.8	0.0	0.0	1.8	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.7	0.4	0.0	8.9	1.9	0.0	0.0	3.1	0.0	1.4
LnGrp Delay(d),s/veh	18.6	0.0	7.2	7.6	0.0	13.2	19.5	0.0	0.0	21.3	0.0	19.0
LnGrp LOS	B		A	A		B	B			C		B
Approach Vol, veh/h		105			632			121				266
Approach Delay, s/veh		11.2			12.9			19.5				20.5
Approach LOS		B			B			B				C
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		28.0		47.0		28.0		47.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		24.0		43.0		24.0		43.0				
Max Q Clear Time (g_c+I1), s		6.0		23.3		8.9		20.9				
Green Ext Time (p_c), s		1.8		5.4		1.7		5.7				
Intersection Summary												
HCM 2010 Ctrl Delay				15.2								
HCM 2010 LOS				B								

Intersection												
Intersection Delay, s/veh	9.4											
Intersection LOS	A											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	2	73	5	0	115	61	47	0	19	26	96
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	0	2	79	5	0	125	66	51	0	21	28	104
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	2	2
HCM Control Delay	9.1	9.5	9.7
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	13%	100%	0%	100%	0%	100%	0%
Vol Thru, %	18%	0%	94%	0%	56%	0%	84%
Vol Right, %	68%	0%	6%	0%	44%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	141	2	78	115	108	33	89
LT Vol	19	2	0	115	0	33	0
Through Vol	26	0	73	0	61	0	75
RT Vol	96	0	5	0	47	0	14
Lane Flow Rate	153	2	85	125	117	36	97
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.22	0.004	0.13	0.204	0.165	0.06	0.146
Departure Headway (Hd)	5.177	6.07	5.519	5.882	5.071	6.06	5.446
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	690	586	645	608	703	588	655
Service Time	3.24	3.845	3.294	3.645	2.834	3.828	3.213
HCM Lane V/C Ratio	0.222	0.003	0.132	0.206	0.166	0.061	0.148
HCM Control Delay	9.7	8.9	9.1	10.2	8.8	9.2	9.2
HCM Lane LOS	A	A	A	B	A	A	A
HCM 95th-tile Q	0.8	0	0.4	0.8	0.6	0.2	0.5

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	33	75	14
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	36	82	15
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	9.2
HCM LOS	A

Lane

Intersection												
Intersection Delay, s/veh	39											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	59	96	12	0	59	85	574	0	21	45	129
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	0	64	104	13	0	64	92	624	0	23	49	140
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	2	2
HCM Control Delay	13.5	60.4	17.3
HCM LOS	B	F	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	11%	100%	0%	100%	0%	100%	0%
Vol Thru, %	23%	0%	89%	0%	13%	0%	19%
Vol Right, %	66%	0%	11%	0%	87%	0%	81%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	195	59	108	59	659	289	137
LT Vol	21	59	0	59	0	289	0
Through Vol	45	0	96	0	85	0	26
RT Vol	129	0	12	0	574	0	111
Lane Flow Rate	212	64	117	64	716	314	149
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.458	0.153	0.262	0.14	1	0.705	0.29
Departure Headway (Hd)	7.78	8.613	8.034	7.833	6.693	8.077	7.012
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	462	415	446	455	544	446	512
Service Time	5.845	6.391	5.811	5.621	4.48	5.83	4.765
HCM Lane V/C Ratio	0.459	0.154	0.262	0.141	1.316	0.704	0.291
HCM Control Delay	17.3	13	13.7	11.9	64.7	28	12.6
HCM Lane LOS	C	B	B	B	F	D	B
HCM 95th-tile Q	2.4	0.5	1	0.5	14.1	5.4	1.2

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	289	26	111
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	314	28	121
Number of Lanes	0	1	1	0

Approach SB

Opposing Approach NB

Opposing Lanes 1

Conflicting Approach Left WB

Conflicting Lanes Left 2

Conflicting Approach Right EB

Conflicting Lanes Right 2








HCM Control Delay 23

HCM LOS C

Lane

Queues

1: California Avenue & Tioga Avenue








							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	2	84	125	117	153	36	97
v/c Ratio	0.00	0.09	0.20	0.13	0.21	0.07	0.13
Control Delay	10.5	10.7	10.2	5.1	6.5	14.8	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	10.7	10.2	5.1	6.5	14.8	13.1
Queue Length 50th (ft)	1	20	26	11	14	11	25
Queue Length 95th (ft)	4	43	57	36	49	28	54
Internal Link Dist (ft)		369		206	566		298
Turn Bay Length (ft)	85		75			60	
Base Capacity (vph)	619	902	637	875	733	506	758
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.09	0.20	0.13	0.21	0.07	0.13
Intersection Summary							

HCM 2010 Signalized Intersection Summary
1: California Avenue & Tioga Avenue

TAMC Regional ICE - Sand City
Proposed AM (2040)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	73	5	115	61	47	19	26	96	33	75	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	2	79	5	125	66	51	21	28	104	36	82	15
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	662	845	53	696	476	368	109	154	451	618	632	116
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1270	1734	110	1308	976	754	141	374	1093	1253	1533	280
Grp Volume(v), veh/h	2	0	84	125	0	117	153	0	0	36	0	97
Grp Sat Flow(s),veh/h/ln	1270	0	1843	1308	0	1730	1608	0	0	1253	0	1813
Q Serve(g_s), s	0.1	0.0	2.0	4.5	0.0	3.0	0.0	0.0	0.0	0.0	0.0	2.7
Cycle Q Clear(g_c), s	3.0	0.0	2.0	6.5	0.0	3.0	4.8	0.0	0.0	1.2	0.0	2.7
Prop In Lane	1.00		0.06	1.00		0.44	0.14		0.68	1.00		0.15
Lane Grp Cap(c), veh/h	662	0	899	696	0	843	714	0	0	618	0	748
V/C Ratio(X)	0.00	0.00	0.09	0.18	0.00	0.14	0.21	0.00	0.00	0.06	0.00	0.13
Avail Cap(c_a), veh/h	662	0	899	696	0	843	714	0	0	618	0	748
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	0.99	0.00	0.99	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	0.0	11.0	12.8	0.0	11.3	15.2	0.0	0.0	14.2	0.0	14.6
Incr Delay (d2), s/veh	0.0	0.0	0.2	0.6	0.0	0.3	0.7	0.0	0.0	0.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.0	1.7	0.0	1.5	2.3	0.0	0.0	0.5	0.0	1.4
LnGrp Delay(d),s/veh	12.1	0.0	11.2	13.3	0.0	11.6	15.9	0.0	0.0	14.3	0.0	14.9
LnGrp LOS	B		B	B		B	B			B		B
Approach Vol, veh/h		86			242			153				133
Approach Delay, s/veh		11.2			12.5			15.9				14.8
Approach LOS		B			B			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		37.0		43.0		37.0		43.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		33.0		39.0		33.0		39.0				
Max Q Clear Time (g_c+I1), s		6.8		5.0		4.7		8.5				
Green Ext Time (p_c), s		1.7		1.7		1.8		1.7				
Intersection Summary												
HCM 2010 Ctrl Delay				13.7								
HCM 2010 LOS				B								

Queues
1: California Avenue & Tioga Avenue

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	64	117	64	716	212	314	149
v/c Ratio	0.33	0.12	0.10	0.63	0.32	0.80	0.23
Control Delay	14.5	7.1	3.3	5.4	7.1	36.3	5.5
Queue Delay	0.0	0.0	0.0	0.7	0.1	4.8	0.0
Total Delay	14.5	7.1	3.3	6.1	7.2	41.1	5.5
Queue Length 50th (ft)	12	18	4	39	17	100	7
Queue Length 95th (ft)	40	39	m5	m74	58	#226	39
Internal Link Dist (ft)		369		206	566		298
Turn Bay Length (ft)	85		75			60	
Base Capacity (vph)	193	952	656	1138	664	392	650
Starvation Cap Reductn	0	0	0	161	0	0	0
Spillback Cap Reductn	0	117	0	0	67	38	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.10	0.73	0.36	0.89	0.23

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
1: California Avenue & Tioga Avenue

TAMC Regional ICE - Sand City
Proposed PM (2040)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	59	96	12	59	85	574	21	45	129	289	26	111
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	64	104	13	64	92	624	23	49	140	314	28	121
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	216	839	105	734	107	727	95	166	377	539	107	463
Arrive On Green	0.52	0.52	0.52	0.52	0.52	0.52	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	732	1624	203	1270	207	1407	81	473	1077	1189	306	1323
Grp Volume(v), veh/h	64	0	117	64	0	716	212	0	0	314	0	149
Grp Sat Flow(s),veh/h/ln	732	0	1827	1270	0	1614	1631	0	0	1189	0	1629
Q Serve(g_s), s	5.0	0.0	2.0	1.6	0.0	23.1	0.0	0.0	0.0	8.1	0.0	3.9
Cycle Q Clear(g_c), s	28.1	0.0	2.0	3.6	0.0	23.1	5.7	0.0	0.0	13.8	0.0	3.9
Prop In Lane	1.00		0.11	1.00		0.87	0.11		0.66	1.00		0.81
Lane Grp Cap(c), veh/h	216	0	944	734	0	834	637	0	0	539	0	570
V/C Ratio(X)	0.30	0.00	0.12	0.09	0.00	0.86	0.33	0.00	0.00	0.58	0.00	0.26
Avail Cap(c_a), veh/h	216	0	944	734	0	834	637	0	0	539	0	570
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(l)	1.00	0.00	1.00	0.61	0.00	0.61	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	7.5	8.4	0.0	12.6	14.5	0.0	0.0	17.1	0.0	14.0
Incr Delay (d2), s/veh	3.5	0.0	0.3	0.1	0.0	7.2	1.4	0.0	0.0	4.5	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.0	0.6	0.0	11.8	2.8	0.0	0.0	5.2	0.0	1.9
LnGrp Delay(d),s/veh	28.3	0.0	7.8	8.6	0.0	19.8	15.9	0.0	0.0	21.7	0.0	15.1
LnGrp LOS	C		A	A		B	B			C		B
Approach Vol, veh/h		181			780			212				463
Approach Delay, s/veh		15.0			18.9			15.9				19.5
Approach LOS		B			B			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		25.0		35.0		25.0		35.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		21.0		31.0		21.0		31.0				
Max Q Clear Time (g_c+I1), s		7.7		30.1		15.8		25.1				
Green Ext Time (p_c), s		3.1		0.6		1.7		3.3				
Intersection Summary												
HCM 2010 Ctrl Delay				18.3								
HCM 2010 LOS				B								

TIOGA AVENUE AT CALIFORNIA AVENUE

Sidra Outputs

LANE SUMMARY

 Site: 2012 Proposed AM - Final

Roundabout
Design Life Analysis (Capacity): Results for 100 years

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h										
South: California Avenue													
Lane 1 ^d	238	2.0	1186	0.201	100	4.8	LOS A	1.0	25.2	Full	1600	0.0	0.0
Approach	238	2.0		0.201		4.8	LOS A	1.0	25.2				
East: Tioga Avenue													
Lane 1 ^d	376	2.0	1316	0.286	100	5.3	LOS A	1.6	41.3	Full	200	0.0	0.0
Approach	376	2.0		0.286		5.3	LOS A	1.6	41.3				
North: California Avenue													
Lane 1 ^d	206	2.0	1083	0.190	100	5.1	LOS A	0.8	19.3	Full	450	0.0	0.0
Approach	206	2.0		0.190		5.1	LOS A	0.8	19.3				
West: Tioga Avenue													
Lane 1 ^d	135	2.0	1012	0.134	100	4.8	LOS A	0.5	13.8	Full	415	0.0	0.0
Approach	135	2.0		0.134		4.8	LOS A	0.5	13.8				
Intersection	956	2.0		0.286		5.0	LOS A	1.6	41.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2012 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: California Avenue													
Lane 1 ^d	122	2.0	1078	0.113	100	4.3	LOS A	0.5	12.8	Full	1600	0.0	0.0
Approach	122	2.0		0.113		4.3	LOS A	0.5	12.8				
East: Tioga Avenue													
Lane 1 ^d	633	2.0	1317	0.480	100	7.6	LOS A	3.6	91.4	Full	200	0.0	0.0
Approach	633	2.0		0.480		7.6	LOS A	3.6	91.4				
North: California Avenue													
Lane 1 ^d	266	2.0	1304	0.204	100	4.5	LOS A	0.9	22.9	Full	450	0.0	0.0
Approach	266	2.0		0.204		4.5	LOS A	0.9	22.9				
West: Tioga Avenue													
Lane 1 ^d	104	2.0	1133	0.092	100	4.0	LOS A	0.4	10.1	Full	415	0.0	0.0
Approach	104	2.0		0.092		4.0	LOS A	0.4	10.1				
Intersection	1125	2.0		0.480		6.2	LOS A	3.6	91.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: California Avenue													
Lane 1 ^d	153	2.0	1266	0.121	100	3.8	LOS A	0.6	14.4	Full	1600	0.0	0.0
Approach	153	2.0		0.121		3.8	LOS A	0.6	14.4				
East: Tioga Avenue													
Lane 1 ^d	242	2.0	1354	0.179	100	4.1	LOS A	0.9	23.1	Full	200	0.0	0.0
Approach	242	2.0		0.179		4.1	LOS A	0.9	23.1				
North: California Avenue													
Lane 1 ^d	133	2.0	1199	0.111	100	3.9	LOS A	0.4	10.5	Full	450	0.0	0.0
Approach	133	2.0		0.111		3.9	LOS A	0.4	10.5				
West: Tioga Avenue													
Lane 1 ^d	87	2.0	1146	0.076	100	3.8	LOS A	0.3	7.6	Full	415	0.0	0.0
Approach	87	2.0		0.076		3.8	LOS A	0.3	7.6				
Intersection	615	2.0		0.179		4.0	LOS A	0.9	23.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: California Avenue													
Lane 1 ^d	212	2.0	876	0.242	100	6.6	LOS A	1.1	28.4	Full	1600	0.0	0.0
Approach	212	2.0		0.242		6.6	LOS A	1.1	28.4				
East: Tioga Avenue													
Lane 1 ^d	780	2.0	1243	0.628	100	10.8	LOS B	5.7	144.9	Full	200	0.0	0.0
Approach	780	2.0		0.628		10.8	LOS B	5.7	144.9				
North: California Avenue													
Lane 1 ^d	463	2.0	1210	0.383	100	6.7	LOS A	2.1	54.0	Full	450	0.0	0.0
Approach	463	2.0		0.383		6.7	LOS A	2.1	54.0				
West: Tioga Avenue													
Lane 1 ^d	182	2.0	953	0.191	100	5.6	LOS A	0.9	21.8	Full	415	0.0	0.0
Approach	182	2.0		0.191		5.6	LOS A	0.9	21.8				
Intersection	1637	2.0		0.628		8.5	LOS A	5.7	144.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

TIOGA AVENUE AT DEL MONTE BOULEVARD

Capital Cost Worksheet

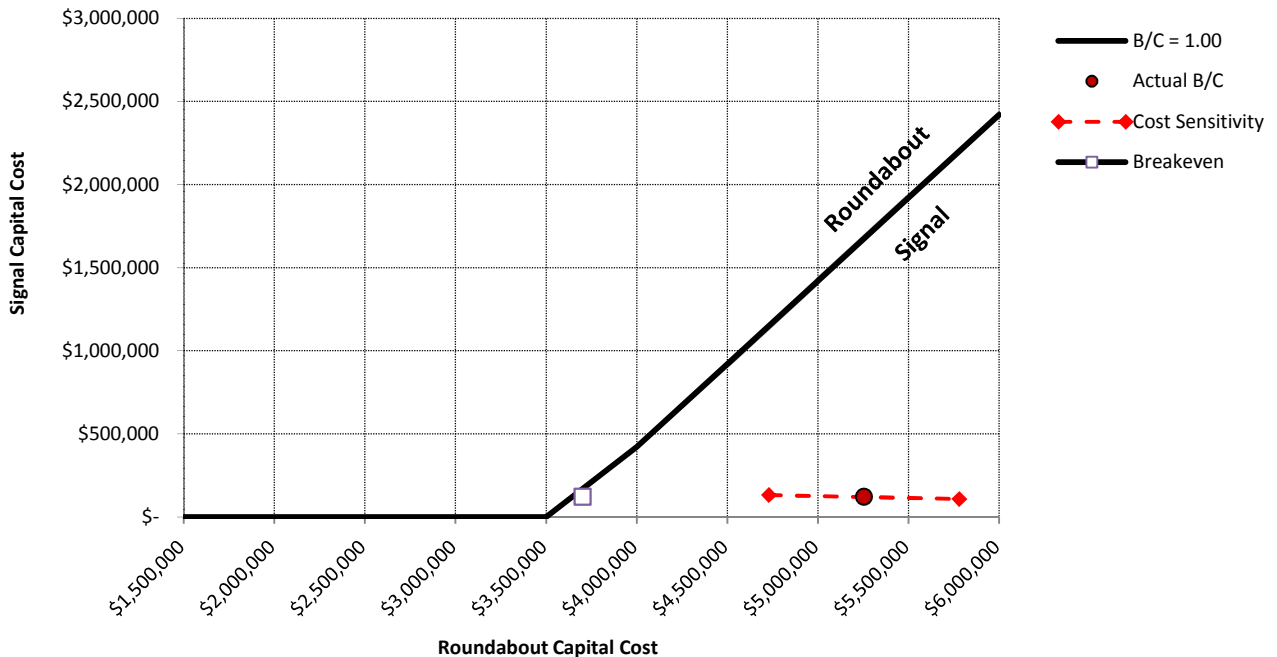
City of Sand City						Capital Cost Worksheet	
SCY_02		Tioga Avenue at Del Monte Boulevard				01/16	
Capital Cost				Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)
B/C Target	SIGNAL (a)	ROUNDAABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)		
Actual	\$ 121,200	\$ 5,253,250	\$ 5,132,050	\$ (157,030)	\$ 3,422,478	\$ 4,975,020	0.69
High	\$ 133,320	\$ 4,727,925	\$ 4,594,605			\$ 4,437,575	0.77
Low	\$ 109,080	\$ 5,778,575	\$ 5,669,495			\$ 5,512,465	0.62
Breakeven	\$ 121,200	\$ 3,700,708	\$ 3,579,508			\$ 3,422,478	1.00
Custom 1							
Custom 2							

Capital Cost Relationship (B/C=1.00)			Cost Sensitivity Assumptions		
SIGNAL	ROUNDAABOUT		Percent Adjustment to Cost		
B/C Target	Signal	Roundabout	B/C Target	Signal	Roundabout
\$ -	\$ 1,500,000		High	10%	-10%
\$ -	\$ 2,000,000		Low	-10%	10%
\$ -	\$ 2,500,000		Breakeven	0%	-30%
\$ -	\$ 3,000,000		Custom 1		
\$ -	\$ 3,500,000		Custom 2		
\$ 420,492	\$ 4,000,000				
\$ 920,492	\$ 4,500,000				
\$ 1,420,492	\$ 5,000,000				
\$ 1,920,492	\$ 5,500,000				
\$ 2,420,492	\$ 6,000,000				

Chart Assumptions		
Cost Increase	\$ 500,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



TIOGA AVENUE AT DEL MONTE BOULEVARD

Turning Movement Volumes

EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	16	133	10	7	16	12	48	418	83	23	36	49
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	333	536	33	20	80	39	7	341	169	103	79	115
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
<i>Source: Fehr and Peers Study (January 2012), 2012</i>												











CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	28	232	17	12	28	21	84	728	145	40	63	85
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck %	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	409	933	57	35	101	68	12	594	208	179	138	200
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
<i>Source: Kittelson & Associates Inc (2% growth rate)</i>												

TIOGA AVENUE AT DEL MONTE BOULEVARD

Synchro Outputs
























Queues
2: Tioga Avenue & Del Monte Boulevard

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	25	92	8	17	13	17	156	52	454	90
v/c Ratio	0.17	0.32	0.07	0.08	0.04	0.14	0.07	0.29	0.34	0.08
Control Delay	30.0	15.2	29.6	25.6	0.2	31.0	7.4	31.2	7.0	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	15.2	29.6	25.6	0.2	31.0	7.4	31.2	7.0	1.1
Queue Length 50th (ft)	8	12	3	5	0	5	10	16	36	0
Queue Length 95th (ft)	31	50	15	22	0	24	31	51	192	11
Internal Link Dist (ft)		206		241			444		667	
Turn Bay Length (ft)	75		200		125	185		225		
Base Capacity (vph)	151	588	120	572	577	120	2277	181	1348	1181
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.16	0.07	0.03	0.02	0.14	0.07	0.29	0.34	0.08
Intersection Summary										











HCM 2010 Signalized Intersection Summary

2: Tioga Avenue & Del Monte Boulevard

TAMC Regional ICE - Sand City
Existing AM (2012)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	36	49	7	16	12	16	133	10	48	418	83
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	25	39	53	8	17	13	17	145	11	52	454	90
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	62	85	15	135	115	30	1897	143	71	1102	937
Arrive On Green	0.02	0.09	0.09	0.01	0.07	0.07	0.02	0.57	0.57	0.04	0.59	0.59
Sat Flow, veh/h	1774	717	974	1774	1863	1583	1774	3337	251	1774	1863	1583
Grp Volume(v), veh/h	25	0	92	8	17	13	17	76	80	52	454	90
Grp Sat Flow(s),veh/h/ln	1774	0	1691	1774	1863	1583	1774	1770	1818	1774	1863	1583
Q Serve(g_s), s	0.8	0.0	2.8	0.2	0.5	0.4	0.5	1.1	1.1	1.6	7.1	1.3
Cycle Q Clear(g_c), s	0.8	0.0	2.8	0.2	0.5	0.4	0.5	1.1	1.1	1.6	7.1	1.3
Prop In Lane	1.00		0.58	1.00		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	41	0	147	15	135	115	30	1006	1034	71	1102	937
V/C Ratio(X)	0.61	0.00	0.62	0.54	0.13	0.11	0.57	0.08	0.08	0.73	0.41	0.10
Avail Cap(c_a), veh/h	164	0	594	131	620	527	131	1006	1034	197	1102	937
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	0.0	23.8	26.7	23.5	23.5	26.4	5.3	5.3	25.7	6.0	4.8
Incr Delay (d2), s/veh	13.7	0.0	4.3	27.0	0.4	0.4	16.4	0.1	0.1	13.4	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	1.5	0.2	0.3	0.2	0.4	0.5	0.6	1.0	3.9	0.6
LnGrp Delay(d),s/veh	39.8	0.0	28.1	53.7	23.9	23.9	42.8	5.4	5.4	39.0	7.1	5.0
LnGrp LOS	D		C	D	C	C	D	A	A	D	A	A
Approach Vol, veh/h		117			38			173			596	
Approach Delay, s/veh		30.6			30.2			9.1			9.6	
Approach LOS		C			C			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	34.7	4.5	8.7	4.9	36.0	5.3	7.9				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	6.0	30.0	4.0	19.0	4.0	32.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	3.6	3.1	2.2	4.8	2.5	9.1	2.8	2.5				
Green Ext Time (p_c), s	0.0	4.2	0.0	0.5	0.0	4.0	0.0	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			13.0									
HCM 2010 LOS			B									

Queues
2: Tioga Avenue & Del Monte Boulevard

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	112	211	22	39	42	372	619	8	371	222
v/c Ratio	0.52	0.53	0.19	0.17	0.12	1.17	0.29	0.07	0.51	0.29
Control Delay	37.5	18.6	35.0	27.8	0.7	136.4	8.1	32.3	19.4	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	18.6	35.0	27.8	0.7	136.4	8.1	32.3	19.4	3.9
Queue Length 50th (ft)	43	35	9	15	0	~193	55	3	115	0
Queue Length 95th (ft)	#104	101	30	39	0	#372	130	16	214	42
Internal Link Dist (ft)		206		241			444		667	
Turn Bay Length (ft)	75		200		125	185		225		
Base Capacity (vph)	230	617	115	485	552	317	2153	115	728	754
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.34	0.19	0.08	0.08	1.17	0.29	0.07	0.51	0.29

Intersection Summary











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

HCM 2010 Signalized Intersection Summary
2: Tioga Avenue & Del Monte Boulevard













TAMC Regional ICE - Sand City
Existing PM (2012)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	103	79	115	20	36	39	342	536	33	7	341	204
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	112	86	125	22	39	42	372	583	36	8	371	222
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	144	116	169	36	201	171	310	1856	114	15	711	604
Arrive On Green	0.08	0.17	0.17	0.02	0.11	0.11	0.17	0.55	0.55	0.01	0.38	0.38
Sat Flow, veh/h	1774	687	999	1774	1863	1583	1774	3387	209	1774	1863	1583
Grp Volume(v), veh/h	112	0	211	22	39	42	372	304	315	8	371	222
Grp Sat Flow(s),veh/h/ln	1774	0	1686	1774	1863	1583	1774	1770	1826	1774	1863	1583
Q Serve(g_s), s	3.9	0.0	7.5	0.8	1.2	1.5	11.0	5.9	5.9	0.3	9.7	6.3
Cycle Q Clear(g_c), s	3.9	0.0	7.5	0.8	1.2	1.5	11.0	5.9	5.9	0.3	9.7	6.3
Prop In Lane	1.00		0.59	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	144	0	285	36	201	171	310	970	1001	15	711	604
V/C Ratio(X)	0.78	0.00	0.74	0.61	0.19	0.25	1.20	0.31	0.31	0.54	0.52	0.37
Avail Cap(c_a), veh/h	226	0	536	113	474	403	310	970	1001	113	711	604
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	0.0	24.8	30.6	25.6	25.7	25.9	7.8	7.8	31.1	15.0	14.0
Incr Delay (d2), s/veh	8.7	0.0	3.8	15.6	0.5	0.7	116.4	0.8	0.8	27.7	2.7	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	3.8	0.5	0.6	0.7	15.3	3.1	3.2	0.2	5.5	3.1
LnGrp Delay(d),s/veh	37.1	0.0	28.6	46.1	26.0	26.4	142.4	8.6	8.6	58.8	17.8	15.7
LnGrp LOS	D		C	D	C	C	F	A	A	E	B	B
Approach Vol, veh/h		323			103			991			601	
Approach Delay, s/veh		31.5			30.5			58.8			17.5	
Approach LOS		C			C			E			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.5	38.5	5.3	14.6	15.0	28.0	9.1	10.8				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	31.0	4.0	20.0	11.0	24.0	8.0	16.0				
Max Q Clear Time (g_c+I1), s	2.3	7.9	2.8	9.5	13.0	11.7	5.9	3.5				
Green Ext Time (p_c), s	0.0	7.2	0.0	1.2	0.0	5.4	0.0	1.3				
Intersection Summary												
HCM 2010 Ctrl Delay			40.7									
HCM 2010 LOS			D									











Queues
2: Tioga Avenue & Del Monte Boulevard

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	25	92	8	17	13	17	156	52	454	90
v/c Ratio	0.21	0.16	0.09	0.03	0.02	0.18	0.09	0.37	0.46	0.10
Control Delay	34.9	7.8	35.9	22.0	0.1	38.6	11.6	40.9	13.6	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	7.8	35.9	22.0	0.1	38.6	11.6	40.9	13.6	1.4
Queue Length 50th (ft)	11	12	4	6	0	8	17	23	88	0
Queue Length 95th (ft)	36	43	17	21	0	27	39	57	243	12
Internal Link Dist (ft)		206		241			444		667	
Turn Bay Length (ft)	75		200		125	185		225		
Base Capacity (vph)	118	577	94	541	552	94	1666	141	993	905
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.16	0.09	0.03	0.02	0.18	0.09	0.37	0.46	0.10
Intersection Summary										

HCM 2010 Signalized Intersection Summary
 2: Tioga Avenue & Del Monte Boulevard

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔↔		↔	↔	↔
Volume (veh/h)	23	36	49	7	16	12	16	133	10	48	418	83
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	25	39	53	8	17	13	17	145	11	52	454	90
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	185	182	247	161	447	380	28	1335	100	76	795	676
Arrive On Green	0.10	0.25	0.25	0.09	0.24	0.24	0.02	0.40	0.40	0.04	0.43	0.43
Sat Flow, veh/h	1774	717	974	1774	1863	1583	1774	3337	251	1774	1863	1583
Grp Volume(v), veh/h	25	0	92	8	17	13	17	76	80	52	454	90
Grp Sat Flow(s),veh/h/ln	1774	0	1691	1774	1863	1583	1774	1770	1818	1774	1863	1583
Q Serve(g_s), s	1.0	0.0	3.2	0.3	0.5	0.5	0.7	2.0	2.1	2.2	13.9	2.6
Cycle Q Clear(g_c), s	1.0	0.0	3.2	0.3	0.5	0.5	0.7	2.0	2.1	2.2	13.9	2.6
Prop In Lane	1.00		0.58	1.00		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	185	0	428	161	447	380	28	708	727	76	795	676
V/C Ratio(X)	0.14	0.00	0.21	0.05	0.04	0.03	0.60	0.11	0.11	0.69	0.57	0.13
Avail Cap(c_a), veh/h	185	0	428	161	447	380	95	708	727	142	795	676
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.5	0.0	22.1	31.1	21.9	21.8	36.7	14.1	14.1	35.4	16.3	13.1
Incr Delay (d2), s/veh	0.3	0.0	1.1	0.1	0.2	0.2	18.9	0.3	0.3	10.6	3.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	1.6	0.2	0.3	0.2	0.5	1.0	1.1	1.3	7.7	1.2
LnGrp Delay(d),s/veh	30.9	0.0	23.3	31.3	22.0	22.0	55.6	14.4	14.4	46.0	19.3	13.5
LnGrp LOS	C		C	C	C	C	E	B	B	D	B	B
Approach Vol, veh/h		117			38			173			596	
Approach Delay, s/veh		24.9			24.0			18.5			20.7	
Approach LOS		C			C			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	34.0	10.8	23.0	5.2	36.0	11.8	22.0				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	6.0	30.0	4.0	19.0	4.0	32.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	4.2	4.1	2.3	5.2	2.7	15.9	3.0	2.5				
Green Ext Time (p_c), s	0.0	0.8	0.0	0.3	0.0	2.8	0.0	0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			21.0									
HCM 2010 LOS			C									

Queues
2: Tioga Avenue & Del Monte Boulevard

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	112	211	22	39	42	372	619	8	371	222
v/c Ratio	0.69	0.33	0.23	0.08	0.07	0.93	0.36	0.09	0.88	0.40
Control Delay	49.5	3.6	40.2	22.8	0.3	61.4	13.2	35.9	52.3	5.2
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	4.0	40.2	22.8	0.3	61.4	13.2	35.9	52.3	5.2
Queue Length 50th (ft)	28	0	10	14	0	170	83	4	167	0
Queue Length 95th (ft)	#117	13	32	37	0	#328	148	17	#317	41
Internal Link Dist (ft)		206		241			444		667	
Turn Bay Length (ft)	75		200		125	185		225		
Base Capacity (vph)	165	647	94	502	564	401	1706	94	422	549
Starvation Cap Reductn	0	145	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.42	0.23	0.08	0.07	0.93	0.36	0.09	0.88	0.40

Intersection Summary











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

HCM 2010 Signalized Intersection Summary
 2: Tioga Avenue & Del Monte Boulevard

TAMC Regional ICE - Sand City
 Proposed PM (2012)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	103	79	115	20	36	39	342	536	33	7	341	204
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	112	86	125	22	39	42	372	583	36	8	371	222
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	143	192	280	95	470	400	402	1508	93	15	422	359
Arrive On Green	0.03	0.09	0.09	0.05	0.25	0.25	0.23	0.45	0.45	0.01	0.23	0.23
Sat Flow, veh/h	1774	687	999	1774	1863	1583	1774	3387	209	1774	1863	1583
Grp Volume(v), veh/h	112	0	211	22	39	42	372	304	315	8	371	222
Grp Sat Flow(s),veh/h/ln	1774	0	1686	1774	1863	1583	1774	1770	1826	1774	1863	1583
Q Serve(g_s), s	4.7	0.0	8.9	0.9	1.2	1.5	15.4	8.6	8.7	0.3	14.4	9.5
Cycle Q Clear(g_c), s	4.7	0.0	8.9	0.9	1.2	1.5	15.4	8.6	8.7	0.3	14.4	9.5
Prop In Lane	1.00		0.59	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	143	0	472	95	470	400	402	788	813	15	422	359
V/C Ratio(X)	0.78	0.00	0.45	0.23	0.08	0.11	0.93	0.39	0.39	0.55	0.88	0.62
Avail Cap(c_a), veh/h	166	0	472	95	470	400	402	788	813	95	422	359
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.8	0.0	28.5	34.0	21.4	21.5	28.4	13.9	13.9	37.1	28.0	26.1
Incr Delay (d2), s/veh	17.8	0.0	2.9	1.2	0.3	0.5	27.1	1.4	1.4	28.7	22.0	7.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	4.5	0.5	0.7	0.7	10.6	4.5	4.7	0.3	10.0	4.9
LnGrp Delay(d),s/veh	53.6	0.0	31.4	35.3	21.7	22.1	55.4	15.4	15.3	65.8	50.0	33.9
LnGrp LOS	D		C	D	C	C	E	B	B	E	D	C
Approach Vol, veh/h		323			103			991			601	
Approach Delay, s/veh		39.1			24.8			30.4			44.3	
Approach LOS		D			C			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.6	37.4	8.0	25.0	21.0	21.0	10.1	22.9				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	30.0	4.0	21.0	17.0	17.0	7.0	18.0				
Max Q Clear Time (g_c+I1), s	2.3	10.7	2.9	10.9	17.4	16.4	6.7	3.5				
Green Ext Time (p_c), s	0.0	6.7	0.0	0.8	0.0	0.4	0.0	0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			35.6									
HCM 2010 LOS			D									

Queues
2: Tioga Avenue & Del Monte Boulevard

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	43	160	13	30	23	30	270	91	791	158
v/c Ratio	0.30	0.43	0.11	0.14	0.08	0.26	0.14	0.53	0.68	0.15
Control Delay	34.6	15.1	32.0	26.4	0.5	35.6	9.1	41.7	16.1	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	15.1	32.0	26.4	0.5	35.6	9.1	41.7	16.1	2.4
Queue Length 50th (ft)	16	22	5	11	0	11	27	34	166	0
Queue Length 95th (ft)	47	75	21	32	0	37	55	#97	#525	28
Internal Link Dist (ft)		206		241			444		667	
Turn Bay Length (ft)	75		200		125	185		225		
Base Capacity (vph)	143	583	114	542	553	114	1901	171	1158	1043
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.27	0.11	0.06	0.04	0.26	0.14	0.53	0.68	0.15

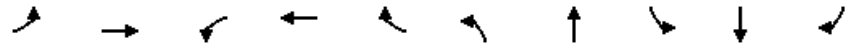
Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 2: Tioga Avenue & Del Monte Boulevard

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	63	85	12	28	21	28	232	17	84	728	145
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	43	68	92	13	30	23	30	252	18	91	791	158
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	98	133	23	215	182	47	1716	122	116	1026	873
Arrive On Green	0.03	0.14	0.14	0.01	0.12	0.12	0.03	0.51	0.51	0.07	0.55	0.55
Sat Flow, veh/h	1774	719	972	1774	1863	1583	1774	3352	238	1774	1863	1583
Grp Volume(v), veh/h	43	0	160	13	30	23	30	132	138	91	791	158
Grp Sat Flow(s),veh/h/ln	1774	0	1691	1774	1863	1583	1774	1770	1821	1774	1863	1583
Q Serve(g_s), s	1.4	0.0	5.3	0.4	0.8	0.8	1.0	2.3	2.3	3.0	19.4	2.9
Cycle Q Clear(g_c), s	1.4	0.0	5.3	0.4	0.8	0.8	1.0	2.3	2.3	3.0	19.4	2.9
Prop In Lane	1.00		0.57	1.00		1.00	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	61	0	231	23	215	182	47	906	932	116	1026	873
V/C Ratio(X)	0.71	0.00	0.69	0.56	0.14	0.13	0.64	0.15	0.15	0.78	0.77	0.18
Avail Cap(c_a), veh/h	151	0	548	121	572	486	121	906	932	182	1026	873
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	24.1	28.8	23.3	23.3	28.3	7.5	7.6	27.0	10.3	6.6
Incr Delay (d2), s/veh	13.8	0.0	3.7	19.7	0.3	0.3	13.7	0.3	0.3	10.9	5.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	2.7	0.3	0.5	0.3	0.7	1.2	1.2	1.8	11.5	1.4
LnGrp Delay(d),s/veh	41.8	0.0	27.8	48.5	23.6	23.6	42.0	7.9	7.9	37.8	15.9	7.0
LnGrp LOS	D		C	D	C	C	D	A	A	D	B	A
Approach Vol, veh/h		203			66			300			1040	
Approach Delay, s/veh		30.8			28.5			11.3			16.4	
Approach LOS		C			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	34.0	4.8	12.0	5.5	36.3	6.0	10.8				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	6.0	30.0	4.0	19.0	4.0	32.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	5.0	4.3	2.4	7.3	3.0	21.4	3.4	2.8				
Green Ext Time (p_c), s	0.0	8.6	0.0	0.8	0.0	5.4	0.0	1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			17.8									
HCM 2010 LOS			B									

Queues
2: Tioga Avenue & Del Monte Boulevard


























Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	195	367	38	68	74	455	1076	13	646	257
v/c Ratio	1.00	0.78	0.37	0.22	0.20	2.53	0.55	0.13	0.82	0.31
Control Delay	104.2	31.5	44.5	26.6	2.4	722.8	12.9	36.7	30.8	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	104.2	31.5	44.5	26.6	2.4	722.8	12.9	36.7	30.8	3.5
Queue Length 50th (ft)	~108	117	17	26	0	~361	157	6	268	0
Queue Length 95th (ft)	#233	#238	#48	58	9	#538	278	23	#476	42
Internal Link Dist (ft)		206		241			444		667	
Turn Bay Length (ft)	75		200		125	185		225		
Base Capacity (vph)	195	536	103	434	469	180	1972	103	787	816
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.68	0.37	0.16	0.16	2.53	0.55	0.13	0.82	0.31











Intersection Summary

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

HCM 2010 Signalized Intersection Summary
2: Tioga Avenue & Del Monte Boulevard

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	179	138	200	35	63	68	419	933	57	12	594	236
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	195	150	217	38	68	74	455	1014	62	13	646	257
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	173	170	245	53	332	282	173	1656	101	23	753	640
Arrive On Green	0.10	0.25	0.25	0.03	0.18	0.18	0.10	0.49	0.49	0.01	0.40	0.40
Sat Flow, veh/h	1774	689	997	1774	1863	1583	1774	3389	207	1774	1863	1583
Grp Volume(v), veh/h	195	0	367	38	68	74	455	529	547	13	646	257
Grp Sat Flow(s),veh/h/ln	1774	0	1687	1774	1863	1583	1774	1770	1826	1774	1863	1583
Q Serve(g_s), s	7.0	0.0	15.1	1.5	2.2	2.9	7.0	15.7	15.7	0.5	22.7	8.3
Cycle Q Clear(g_c), s	7.0	0.0	15.1	1.5	2.2	2.9	7.0	15.7	15.7	0.5	22.7	8.3
Prop In Lane	1.00		0.59	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	173	0	415	53	332	282	173	865	893	23	753	640
V/C Ratio(X)	1.13	0.00	0.88	0.72	0.20	0.26	2.63	0.61	0.61	0.58	0.86	0.40
Avail Cap(c_a), veh/h	173	0	446	99	415	353	173	865	893	99	753	640
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	0.0	26.1	34.5	25.2	25.4	32.4	13.4	13.4	35.2	19.5	15.2
Incr Delay (d2), s/veh	106.7	0.0	17.8	17.0	0.3	0.5	750.0	3.2	3.1	21.1	12.2	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	0.0	9.0	1.0	1.2	1.3	39.4	8.3	8.5	0.4	14.0	4.0
LnGrp Delay(d),s/veh	139.1	0.0	43.9	51.6	25.5	25.9	782.4	16.6	16.5	56.3	31.7	17.1
LnGrp LOS	F		D	D	C	C	F	B	B	E	C	B
Approach Vol, veh/h		562			180			1531			916	
Approach Delay, s/veh		76.9			31.2			244.2			28.0	
Approach LOS		E			C			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.9	39.1	6.1	21.7	11.0	33.0	11.0	16.8				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	32.0	4.0	19.0	7.0	29.0	7.0	16.0				
Max Q Clear Time (g_c+I1), s	2.5	17.7	3.5	17.1	9.0	24.7	9.0	4.9				
Green Ext Time (p_c), s	0.0	9.8	0.0	0.6	0.0	3.5	0.0	2.3				
Intersection Summary												
HCM 2010 Ctrl Delay			140.6									
HCM 2010 LOS			F									

Queues
2: Tioga Avenue & Del Monte Boulevard

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	43	160	13	30	23	30	270	91	791	158
v/c Ratio	0.39	0.25	0.13	0.06	0.04	0.34	0.19	0.51	0.85	0.18
Control Delay	40.8	9.3	39.5	24.5	0.1	47.5	15.1	43.9	29.2	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	9.3	39.5	24.5	0.1	47.5	15.1	43.9	29.2	2.2
Queue Length 50th (ft)	18	23	6	12	0	15	43	43	277	0
Queue Length 95th (ft)	40	58	24	33	0	41	68	88	#592	25
Internal Link Dist (ft)		206		241			444		667	
Turn Bay Length (ft)	75		200		125	185		225		
Base Capacity (vph)	110	632	99	545	588	88	1452	199	930	879
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.25	0.13	0.06	0.04	0.34	0.19	0.46	0.85	0.18

Intersection Summary











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

HCM 2010 Signalized Intersection Summary 2: Tioga Avenue & Del Monte Boulevard

TAMC Regional ICE - Sand City
Proposed AM (2040)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	63	85	12	28	21	28	232	17	84	728	145
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	43	68	92	13	30	23	30	252	18	91	791	158
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	156	216	292	22	419	356	43	1341	95	154	862	732
Arrive On Green	0.09	0.30	0.30	0.01	0.22	0.22	0.02	0.40	0.40	0.09	0.46	0.46
Sat Flow, veh/h	1774	719	972	1774	1863	1583	1774	3352	238	1774	1863	1583
Grp Volume(v), veh/h	43	0	160	13	30	23	30	132	138	91	791	158
Grp Sat Flow(s),veh/h/ln	1774	0	1691	1774	1863	1583	1774	1770	1821	1774	1863	1583
Q Serve(g_s), s	1.8	0.0	5.8	0.6	1.0	0.9	1.3	3.9	3.9	3.9	31.7	4.8
Cycle Q Clear(g_c), s	1.8	0.0	5.8	0.6	1.0	0.9	1.3	3.9	3.9	3.9	31.7	4.8
Prop In Lane	1.00		0.57	1.00		1.00	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	156	0	508	22	419	356	43	708	728	154	862	732
V/C Ratio(X)	0.27	0.00	0.31	0.58	0.07	0.06	0.70	0.19	0.19	0.59	0.92	0.22
Avail Cap(c_a), veh/h	156	0	508	89	419	356	89	708	728	200	862	732
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.1	0.0	21.6	39.3	24.4	24.4	38.7	15.6	15.6	35.2	20.1	12.8
Incr Delay (d2), s/veh	0.9	0.0	1.6	22.0	0.3	0.3	18.1	0.6	0.6	3.6	16.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	2.9	0.4	0.6	0.4	0.9	2.0	2.1	2.1	19.9	2.2
LnGrp Delay(d),s/veh	35.0	0.0	23.2	61.3	24.7	24.7	56.9	16.1	16.2	38.7	36.3	13.5
LnGrp LOS	D		C	E	C	C	E	B	B	D	D	B
Approach Vol, veh/h		203			66			300			1040	
Approach Delay, s/veh		25.7			31.9			20.2			33.1	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	36.0	5.0	28.1	5.9	41.0	11.1	22.0				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	9.0	32.0	4.0	19.0	4.0	37.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	5.9	5.9	2.6	7.8	3.3	33.7	3.8	3.0				
Green Ext Time (p_c), s	0.1	1.5	0.0	0.7	0.0	1.8	0.0	0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			29.7									
HCM 2010 LOS			C									

Queues
2: Tioga Avenue & Del Monte Boulevard

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	195	367	38	68	74	455	1076	13	646	257
v/c Ratio	0.95	0.82	0.64	0.26	0.23	1.00	0.50	0.22	0.99	0.38
Control Delay	107.2	45.6	101.3	48.8	3.6	85.9	14.2	65.3	72.4	8.8
Queue Delay	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	107.2	51.2	101.3	48.8	3.6	85.9	14.2	65.3	72.4	8.8
Queue Length 50th (ft)	152	176	30	48	0	353	207	10	495	29
Queue Length 95th (ft)	m#259	m#369	#90	93	13	#570	311	32	#745	92
Internal Link Dist (ft)		206		241			444		667	
Turn Bay Length (ft)	75		200		125	185		225		
Base Capacity (vph)	206	447	59	263	325	457	2160	59	652	685
Starvation Cap Reductn	0	44	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.91	0.64	0.26	0.23	1.00	0.50	0.22	0.99	0.38

Intersection Summary
























95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
2: Tioga Avenue & Del Monte Boulevard

TAMC Regional ICE - Sand City
Proposed PM (2040)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	179	138	200	35	63	68	419	933	57	12	594	236
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	195	150	217	38	68	74	455	1014	62	13	646	257
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	155	224	59	264	224	458	1948	119	59	652	554
Arrive On Green	0.04	0.07	0.07	0.03	0.14	0.14	0.26	0.57	0.57	0.03	0.35	0.35
Sat Flow, veh/h	1774	689	997	1774	1863	1583	1774	3389	207	1774	1863	1583
Grp Volume(v), veh/h	195	0	367	38	68	74	455	529	547	13	646	257
Grp Sat Flow(s),veh/h/ln	1774	0	1687	1774	1863	1583	1774	1770	1826	1774	1863	1583
Q Serve(g_s), s	13.2	0.0	26.0	2.5	3.9	4.5	30.7	21.8	21.8	0.9	41.4	10.9
Cycle Q Clear(g_c), s	13.2	0.0	26.0	2.5	3.9	4.5	30.7	21.8	21.8	0.9	41.4	10.9
Prop In Lane	1.00		0.59	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	207	0	380	59	264	224	458	1018	1050	59	652	554
V/C Ratio(X)	0.94	0.00	0.97	0.64	0.26	0.33	0.99	0.52	0.52	0.22	0.99	0.46
Avail Cap(c_a), veh/h	207	0	380	59	264	224	458	1018	1050	59	652	554
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.75	0.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.3	0.0	55.1	57.3	45.9	36.2	44.4	15.5	15.5	56.5	38.8	15.6
Incr Delay (d2), s/veh	38.8	0.0	32.6	21.3	2.4	3.9	40.1	1.9	1.8	33.1	2.8	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	15.6	1.6	2.2	2.2	20.1	11.1	11.5	0.4	27.2	5.1
LnGrp Delay(d),s/veh	96.1	0.0	87.7	78.5	48.2	40.1	84.5	17.4	17.3	58.3	71.9	18.4
LnGrp LOS	F		F	E	D	D	F	B	B	E	E	B
Approach Vol, veh/h		562			180			1531			916	
Approach Delay, s/veh		90.6			51.3			37.3			56.7	
Approach LOS		F			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	73.0	8.0	31.0	35.0	46.0	18.0	21.0				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	69.0	4.0	27.0	31.0	42.0	14.0	17.0				
Max Q Clear Time (g_c+I1), s	2.9	23.8	4.5	28.0	32.7	43.4	15.2	6.5				
Green Ext Time (p_c), s	0.2	8.7	0.0	0.0	0.0	0.0	0.0	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			53.1									
HCM 2010 LOS			D									

TIOGA AVENUE AT DEL MONTE BOULEVARD

Sidra Outputs

LANE SUMMARY

 Site: 2012 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Del Monte Boulevard													
Lane 1	86	2.0	1273	0.068	100	3.4	LOS A	0.3	6.6	Full	1600	0.0	0.0
Lane 2 ^d	86	2.0	1273	0.068	100	3.4	LOS A	0.3	6.6	Full	1600	0.0	0.0
Approach	173	2.0		0.068		3.4	LOS A	0.3	6.6				
East: The Mall													
Lane 1 ^d	38	2.0	1358	0.028	100	2.9	LOS A	0.1	3.0	Full	600	0.0	0.0
Approach	38	2.0		0.028		2.9	LOS A	0.1	3.0				
North: Del Monte Boulevard													
Lane 1	298	2.0	1352	0.221	100	4.5	LOS A	1.2	29.6	Full	980	0.0	0.0
Lane 2 ^d	298	2.0	1352	0.221	100	4.5	LOS A	1.2	29.6	Full	980	0.0	0.0
Approach	597	2.0		0.221		4.5	LOS A	1.2	29.6				
West: Tioga Avenue													
Lane 1 ^d	117	2.0	1065	0.110	100	4.3	LOS A	0.4	10.8	Full	200	0.0	0.0
Approach	117	2.0		0.110		4.3	LOS A	0.4	10.8				
Intersection	925	2.0		0.221		4.2	LOS A	1.2	29.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2012 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Boulevard													
Lane 1	495	2.0	1174	0.422	100	7.4	LOS A	2.3	59.2	Full	1600	0.0	0.0
Lane 2 ^d	495	2.0	1174	0.422	100	7.4	LOS A	2.3	59.2	Full	1600	0.0	0.0
Approach	990	2.0		0.422		7.4	LOS A	2.3	59.2				
East: The Mall													
Lane 1 ^d	103	2.0	612	0.169	100	7.9	LOS A	0.7	16.6	Full	600	0.0	0.0
Approach	103	2.0		0.169		7.9	LOS A	0.7	16.6				
North: Del Monte Boulevard													
Lane 1	300	2.0	908	0.330	100	7.6	LOS A	1.6	41.6	Full	980	0.0	0.0
Lane 2 ^d	300	2.0	908	0.330	100	7.6	LOS A	1.6	41.6	Full	980	0.0	0.0
Approach	600	2.0		0.330		7.6	LOS A	1.6	41.6				
West: Tioga Avenue													
Lane 1 ^d	323	2.0	1138	0.284	100	5.8	LOS A	1.4	34.6	Full	200	0.0	0.0
Approach	323	2.0		0.284		5.8	LOS A	1.4	34.6				
Intersection	2016	2.0		0.422		7.2	LOS A	2.3	59.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed AM - Final

Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Del Monte Boulevard													
Lane 1	151	2.0	1171	0.129	100	4.2	LOS A	0.5	13.5	Full	1600	0.0	0.0
Lane 2 ^d	151	2.0	1171	0.129	100	4.2	LOS A	0.5	13.5	Full	1600	0.0	0.0
Approach	301	2.0		0.129		4.2	LOS A	0.5	13.5				
East: The Mall													
Lane 1 ^d	66	2.0	1196	0.055	100	3.5	LOS A	0.2	6.0	Full	600	0.0	0.0
Approach	66	2.0		0.055		3.5	LOS A	0.2	6.0				
North: Del Monte Boulevard													
Lane 1	520	2.0	1309	0.397	100	6.5	LOS A	2.6	65.7	Full	980	0.0	0.0
Lane 2 ^d	520	2.0	1309	0.397	100	6.5	LOS A	2.6	65.7	Full	980	0.0	0.0
Approach	1040	2.0		0.397		6.5	LOS A	2.6	65.7				
West: Tioga Avenue													
Lane 1 ^d	204	2.0	775	0.264	100	7.6	LOS A	1.0	26.6	Full	200	0.0	0.0
Approach	204	2.0		0.264		7.6	LOS A	1.0	26.6				
Intersection	1612	2.0		0.397		6.1	LOS A	2.6	65.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2040 Proposed PM - Final

Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Boulevard													
Lane 1	766	2.0	996	0.769	100	18.3	LOS C	8.7	221.8	Full	1600	0.0	0.0
Lane 2 ^d	766	2.0	996	0.769	100	18.3	LOS C	8.7	221.8	Full	1600	0.0	0.0
Approach	1532	2.0		0.769		18.3	LOS C	8.7	221.8				
East: The Mall													
Lane 1 ^d	180	2.0	352	0.513	100	23.1	LOS C	2.3	57.4	Full	600	0.0	0.0
Approach	180	2.0		0.513		23.1	LOS C	2.3	57.4				
North: Del Monte Boulevard													
Lane 1	458	2.0	796	0.575	100	13.3	LOS B	4.0	101.7	Full	980	0.0	0.0
Lane 2 ^d	458	2.0	796	0.575	100	13.3	LOS B	4.0	101.7	Full	980	0.0	0.0
Approach	915	2.0		0.575		13.3	LOS B	4.0	101.7				
West: Tioga Avenue													
Lane 1 ^d	562	2.0	867	0.648	100	14.7	LOS B	4.9	124.9	Full	200	0.0	0.0
Approach	562	2.0		0.648		14.7	LOS B	4.9	124.9				
Intersection	3189	2.0		0.769		16.5	LOS C	8.7	221.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Regional Intersection Control Evaluation
Section 10:

City of Seaside

Appendix B10: Analysis Worksheets

Study Intersections:

- BROADWAY AVENUE AT DEL MONTE BOULEVARD
- BROADWAY AVENUE AT ALHAMBRA STREET



BROADWAY AVENUE AT DEL MONTE BOULEVARD

Capital Cost Worksheet

City of Seaside **Capital Cost Worksheet**

SEA_01 **Broadway Avenue at Del Monte Boulevard**

	Capital Cost			Project Constants		Total Costs (f) = (c + d)	B/C (g) = (e / f)	
	B/C Target	SIGNAL (a)	ROUNDAOBT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)			Total Benefits (e)
Actual	\$ 1,317,200	\$ 4,625,974	\$ 3,308,774	\$ (148,635)	\$ 3,008,478	\$ 3,160,139	0.95	
High	\$ 1,448,920	\$ 4,163,377	\$ 2,714,457			\$ 2,565,822	1.17	
Low	\$ 1,185,480	\$ 5,088,571	\$ 3,903,091			\$ 3,754,456	0.80	
Breakeven	\$ 1,317,200	\$ 4,474,313	\$ 3,157,113			\$ 3,008,478	1.00	
Custom 1								
Custom 2								

**Capital Cost Relationship
(B/C=1.00)**

	SIGNAL	ROUNDAOBT
\$ -	\$ -	\$ 2,500,000
\$ -	\$ -	\$ 3,000,000
\$ -	\$ -	\$ 3,500,000
\$ 842,887	\$ 842,887	\$ 4,000,000
\$ 1,342,887	\$ 1,342,887	\$ 4,500,000
\$ 1,842,887	\$ 1,842,887	\$ 5,000,000
\$ 2,342,887	\$ 2,342,887	\$ 5,500,000
\$ 2,842,887	\$ 2,842,887	\$ 6,000,000
\$ 3,342,887	\$ 3,342,887	\$ 6,500,000
\$ 3,842,887	\$ 3,842,887	\$ 7,000,000

Cost Sensitivity Assumptions

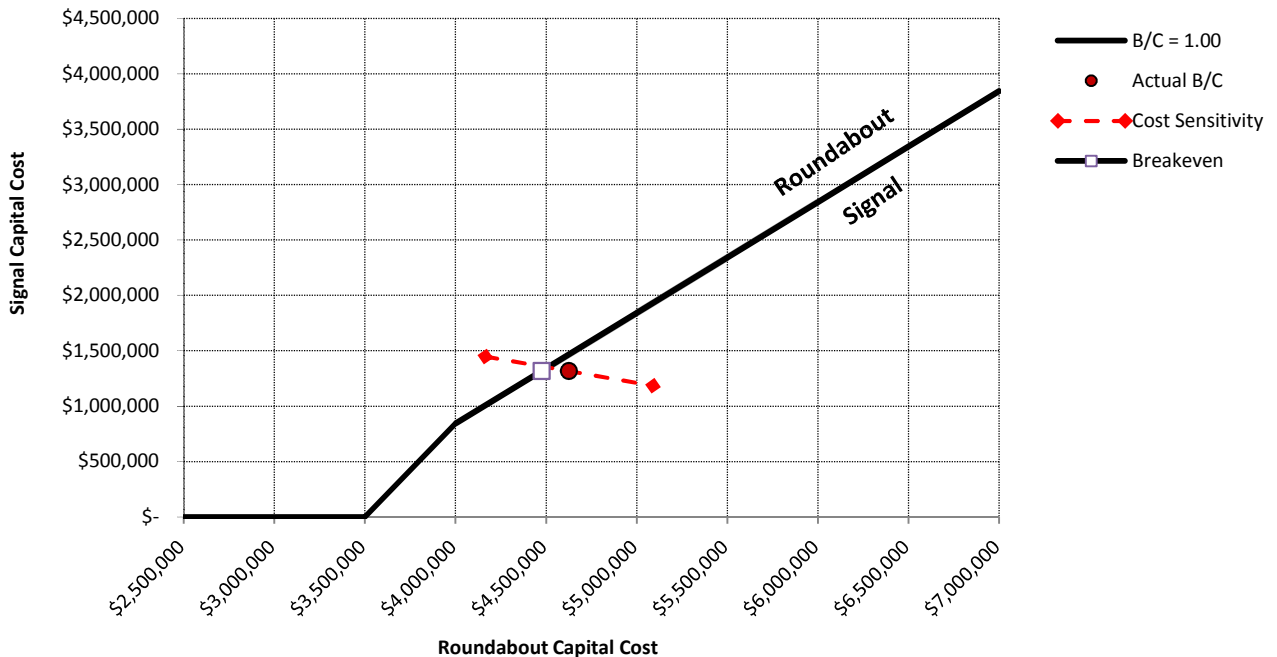
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	-3%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 500,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



BROADWAY AVENUE AT DEL MONTE BOULEVARD

Turning Movement Volumes







EXISTING						
AM	NB		WB		SB	
	↑	↻	↶	↷	↶	↑
EXISTING						
Vehicles	568	221	493	86	43	739
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						







PM			WB		SB	
	↑	↻	↶	↷	↶	↑
EXISTING						
Vehicles	903	470	354	117	102	656
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Fehr & Peers Specific Plan TIA (December 2008), 2012</i>						







CUMULATIVE						
AM			WB		SB	
	↑	↻	↶	↷	↶	↑
CUMULATIVE						
Vehicles	640	249	556	97	48	833
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	4%	2%	2%	2%	2%
Pedestrians						
Bicycles						

PM			WB		SB	
	↑	↻	↶	↷	↶	↑
CUMULATIVE						
Vehicles	1018	530	399	132	115	739
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<i>Source: Fehr & Peers Specific Plan TIA (December 2008), 2027</i>						

EXISTING						
AM	NB		SB		EB	
						
EXISTING						
Vehicles	181	473	644	71	28	138
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						

PM	NB				EB	
						
EXISTING						
Vehicles	86	934	593	41	54	164
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<small>Source: Fehr & Peers Specific Plan TIA (December 2008), 2012</small>						

CUMULATIVE						
AM	NB				EB	
						
CUMULATIVE						
Vehicles	244	533	726	96	38	186
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						







PM	NB				EB	
						
CUMULATIVE						
Vehicles	116	1053	668	55	73	221
PHF	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%
Pedestrians						
Bicycles						
<small>Source: Fehr & Peers Specific Plan TIA (December 2008), 2027</small>						

BROADWAY AVENUE AT DEL MONTE BOULEVARD

Synchro Outputs
















Queues

3: Broadway Ave & Del Monte Ave

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	536	93	617	240	47	803
v/c Ratio	0.72	0.23	0.29	0.24	0.31	0.33
Control Delay	38.2	8.7	10.6	8.9	61.0	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	38.2	8.8	10.6	8.9	61.0	2.2
Queue Length 50th (ft)	146	4	91	48	27	16
Queue Length 95th (ft)	187	39	152	109	65	40
Internal Link Dist (ft)	417		273			178
Turn Bay Length (ft)		75		5	80	
Base Capacity (vph)	1258	634	2148	983	198	2457
Starvation Cap Reductn	0	0	0	0	0	660
Spillback Cap Reductn	0	47	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.16	0.29	0.24	0.24	0.45
Intersection Summary						






HCM 2010 Signalized Intersection Summary
 3: Broadway Ave & Del Monte Ave

TAMC Regional ICE - Seaside
 Existing AM (2012) No Project

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			 		
Volume (veh/h)	493	86	568	221	43	739		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	536	0	617	0	47	803		
Adj No. of Lanes	2	1	2	1	1	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	662	305	2250	1007	68	2544		
Arrive On Green	0.19	0.00	0.64	0.00	0.08	1.00		
Sat Flow, veh/h	3442	1583	3632	1583	1774	3632		
Grp Volume(v), veh/h	536	0	617	0	47	803		
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1583	1774	1770		
Q Serve(g_s), s	13.4	0.0	6.9	0.0	2.3	0.0		
Cycle Q Clear(g_c), s	13.4	0.0	6.9	0.0	2.3	0.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	662	305	2250	1007	68	2544		
V/C Ratio(X)	0.81	0.00	0.27	0.00	0.69	0.32		
Avail Cap(c_a), veh/h	1262	581	2250	1007	197	2544		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00		
Upstream Filter(l)	1.00	0.00	1.00	0.00	0.94	0.94		
Uniform Delay (d), s/veh	34.8	0.0	7.2	0.0	41.0	0.0		
Incr Delay (d2), s/veh	2.4	0.0	0.3	0.0	11.0	0.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	6.6	0.0	3.4	0.0	1.3	0.1		
LnGrp Delay(d),s/veh	37.2	0.0	7.5	0.0	52.1	0.3		
LnGrp LOS	D		A		D	A		
Approach Vol, veh/h	536		617			850		
Approach Delay, s/veh	37.2		7.5			3.2		
Approach LOS	D		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.5	61.2				68.7		21.3
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	10.0	35.0				49.0		33.0
Max Q Clear Time (g_c+I1), s	4.3	8.9				2.0		15.4
Green Ext Time (p_c), s	0.0	11.1				13.4		1.9
Intersection Summary								
HCM 2010 Ctrl Delay			13.6					
HCM 2010 LOS			B					

Queues













1: Del Monte Ave & Contra Coasta Ave

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	29	141	185	483	729
v/c Ratio	0.20	0.54	0.64	0.16	0.34
Control Delay	40.4	15.0	52.9	1.6	9.4
Queue Delay	0.0	0.0	1.6	0.2	0.0
Total Delay	40.4	15.0	54.5	1.8	9.4
Queue Length 50th (ft)	16	0	114	17	91
Queue Length 95th (ft)	41	53	181	25	163
Internal Link Dist (ft)	234			178	366
Turn Bay Length (ft)	130		90		
Base Capacity (vph)	590	621	312	2929	2167
Starvation Cap Reductn	0	0	40	1641	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.23	0.68	0.38	0.34







Intersection Summary

HCM 2010 Signalized Intersection Summary
 1: Del Monte Ave & Contra Coasta Ave

TAMC Regional ICE - Seaside
 Existing AM (2012) No Project

















								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	28	138	181	473	644	71		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900		
Adj Flow Rate, veh/h	29	141	185	483	657	72		
Adj No. of Lanes	1	1	1	2	2	0		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	200	178	221	2826	2026	222		
Arrive On Green	0.11	0.11	0.12	0.80	0.63	0.63		
Sat Flow, veh/h	1774	1583	1774	3632	3311	352		
Grp Volume(v), veh/h	29	141	185	483	361	368		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1801		
Q Serve(g_s), s	1.3	7.8	9.2	2.9	8.5	8.6		
Cycle Q Clear(g_c), s	1.3	7.8	9.2	2.9	8.5	8.6		
Prop In Lane	1.00	1.00	1.00			0.20		
Lane Grp Cap(c), veh/h	200	178	221	2826	1114	1134		
V/C Ratio(X)	0.15	0.79	0.84	0.17	0.32	0.32		
Avail Cap(c_a), veh/h	591	528	276	2826	1114	1134		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	1.00		
Uniform Delay (d), s/veh	36.0	38.9	38.5	2.1	7.8	7.8		
Incr Delay (d2), s/veh	0.3	7.6	16.2	0.1	0.8	0.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.7	7.0	5.5	1.4	4.3	4.4		
LnGrp Delay(d),s/veh	36.4	46.5	54.7	2.2	8.5	8.5		
LnGrp LOS	D	D	D	A	A	A		
Approach Vol, veh/h	170			668	729			
Approach Delay, s/veh	44.8			16.8	8.5			
Approach LOS	D			B	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		75.9		14.1	15.2	60.7		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		52.0		30.0	14.0	34.0		
Max Q Clear Time (g_c+I1), s		4.9		9.8	11.2	10.6		
Green Ext Time (p_c), s		10.0		0.5	0.1	8.4		
Intersection Summary								
HCM 2010 Ctrl Delay			16.0					
HCM 2010 LOS			B					

Queues
3: Broadway Ave & Del Monte Ave






						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	385	127	982	511	111	713
v/c Ratio	0.66	0.34	0.46	0.52	0.52	0.27
Control Delay	40.2	8.4	12.7	12.8	45.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.0
Total Delay	40.2	8.4	12.7	12.8	45.2	5.4
Queue Length 50th (ft)	106	0	160	134	60	56
Queue Length 95th (ft)	144	44	260	277	107	93
Internal Link Dist (ft)	417		273			178
Turn Bay Length (ft)		75		5	80	
Base Capacity (vph)	915	515	2120	984	250	2621
Starvation Cap Reductn	0	0	0	0	0	1564
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.25	0.46	0.52	0.44	0.67
Intersection Summary						

HCM 2010 Signalized Intersection Summary
 3: Broadway Ave & Del Monte Ave

TAMC Regional ICE - Seaside
 Existing PM (2012) No Project













								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 		 	 		
Volume (veh/h)	354	117	903	470	102	656		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	385	0	982	0	111	713		
Adj No. of Lanes	2	1	2	1	1	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	492	226	2281	1020	141	2719		
Arrive On Green	0.14	0.00	0.64	0.00	0.08	0.77		
Sat Flow, veh/h	3442	1583	3632	1583	1774	3632		
Grp Volume(v), veh/h	385	0	982	0	111	713		
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1583	1774	1770		
Q Serve(g_s), s	9.7	0.0	12.3	0.0	5.5	5.3		
Cycle Q Clear(g_c), s	9.7	0.0	12.3	0.0	5.5	5.3		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	492	226	2281	1020	141	2719		
V/C Ratio(X)	0.78	0.00	0.43	0.00	0.79	0.26		
Avail Cap(c_a), veh/h	918	422	2281	1020	237	2719		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.95	0.95		
Uniform Delay (d), s/veh	37.2	0.0	7.9	0.0	40.7	3.0		
Incr Delay (d2), s/veh	2.8	0.0	0.6	0.0	8.9	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	4.8	0.0	6.2	0.0	3.1	2.6		
LnGrp Delay(d),s/veh	40.0	0.0	8.5	0.0	49.6	3.2		
LnGrp LOS	D		A		D	A		
Approach Vol, veh/h	385		982			824		
Approach Delay, s/veh	40.0		8.5			9.5		
Approach LOS	D		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.1	62.0				73.1		16.9
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	12.0	42.0				58.0		24.0
Max Q Clear Time (g_c+I1), s	7.5	14.3				7.3		11.7
Green Ext Time (p_c), s	0.1	14.2				18.1		1.1
Intersection Summary								
HCM 2010 Ctrl Delay			14.4					
HCM 2010 LOS			B					

Queues
5: Del Monte Ave & Contra Coasta Ave







					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	55	167	88	953	647
v/c Ratio	0.25	0.48	0.36	0.34	0.30
Control Delay	25.5	9.7	26.8	3.2	8.6
Queue Delay	0.0	0.0	0.0	0.4	0.0
Total Delay	25.5	9.7	26.8	3.6	8.6
Queue Length 50th (ft)	18	0	29	44	61
Queue Length 95th (ft)	44	43	62	85	116
Internal Link Dist (ft)	234			178	366
Turn Bay Length (ft)	130		90		
Base Capacity (vph)	708	733	248	2779	2148
Starvation Cap Reductn	0	0	0	1221	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.23	0.35	0.61	0.30
Intersection Summary					

HCM 2010 Signalized Intersection Summary
5: Del Monte Ave & Contra Coasta Ave

TAMC Regional ICE - Seaside
Existing PM (2012) No Project
















								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	54	164	86	934	593	41		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900		
Adj Flow Rate, veh/h	55	167	88	953	605	42		
Adj No. of Lanes	1	1	1	2	2	0		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	250	223	114	2569	1998	139		
Arrive On Green	0.14	0.14	0.06	0.73	0.59	0.59		
Sat Flow, veh/h	1774	1583	1774	3632	3452	233		
Grp Volume(v), veh/h	55	167	88	953	318	329		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1822		
Q Serve(g_s), s	1.6	6.1	2.9	6.1	5.3	5.3		
Cycle Q Clear(g_c), s	1.6	6.1	2.9	6.1	5.3	5.3		
Prop In Lane	1.00	1.00	1.00			0.13		
Lane Grp Cap(c), veh/h	250	223	114	2569	1053	1084		
V/C Ratio(X)	0.22	0.75	0.77	0.37	0.30	0.30		
Avail Cap(c_a), veh/h	710	633	177	2569	1053	1084		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.89	0.89	1.00	1.00		
Uniform Delay (d), s/veh	22.8	24.8	27.6	3.1	6.0	6.0		
Incr Delay (d2), s/veh	0.4	5.0	9.6	0.4	0.7	0.7		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.8	5.4	1.7	3.0	2.8	2.9		
LnGrp Delay(d),s/veh	23.3	29.7	37.2	3.5	6.7	6.7		
LnGrp LOS	C	C	D	A	A	A		
Approach Vol, veh/h	222		1041		647			
Approach Delay, s/veh	28.1		6.3		6.7			
Approach LOS	C		A		A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	47.5		12.5		7.8		39.7	
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0	
Max Green Setting (Gmax), s	28.0		24.0		6.0		18.0	
Max Q Clear Time (g_c+I1), s	8.1		8.1		4.9		7.3	
Green Ext Time (p_c), s	10.9		0.6		0.0		7.1	
Intersection Summary								
HCM 2010 Ctrl Delay			9.0					
HCM 2010 LOS			A					

Queues
3: Broadway Ave & Del Monte Ave






						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	604	105	696	271	52	905
v/c Ratio	0.75	0.24	0.34	0.28	0.33	0.38
Control Delay	37.6	9.8	12.1	10.2	44.9	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	37.6	9.8	12.1	10.2	44.9	3.1
Queue Length 50th (ft)	164	9	111	60	18	20
Queue Length 95th (ft)	206	46	183	132	53	21
Internal Link Dist (ft)	417		273			178
Turn Bay Length (ft)		75		5	80	
Base Capacity (vph)	1220	616	2073	952	185	2389
Starvation Cap Reductn	0	0	0	0	0	616
Spillback Cap Reductn	0	29	112	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.18	0.35	0.28	0.28	0.51
Intersection Summary						

HCM 2010 Signalized Intersection Summary
 3: Broadway Ave & Del Monte Ave













TAMC Regional ICE - Seaside
 Future AM (2027) No Project

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			 		
Volume (veh/h)	556	97	640	249	48	833		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	604	0	696	0	52	905		
Adj No. of Lanes	2	1	2	1	1	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	733	337	2171	971	72	2471		
Arrive On Green	0.21	0.00	0.61	0.00	0.03	0.47		
Sat Flow, veh/h	3442	1583	3632	1583	1774	3632		
Grp Volume(v), veh/h	604	0	696	0	52	905		
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1583	1774	1770		
Q Serve(g_s), s	15.1	0.0	8.5	0.0	2.6	14.8		
Cycle Q Clear(g_c), s	15.1	0.0	8.5	0.0	2.6	14.8		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	733	337	2171	971	72	2471		
V/C Ratio(X)	0.82	0.00	0.32	0.00	0.73	0.37		
Avail Cap(c_a), veh/h	1224	563	2171	971	177	2471		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.67	0.67		
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.89	0.89		
Uniform Delay (d), s/veh	33.8	0.0	8.4	0.0	43.3	11.2		
Incr Delay (d2), s/veh	2.4	0.0	0.4	0.0	11.7	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	7.4	0.0	4.3	0.0	1.5	7.3		
LnGrp Delay(d),s/veh	36.2	0.0	8.8	0.0	55.0	11.5		
LnGrp LOS	D		A		D	B		
Approach Vol, veh/h	604		696			957		
Approach Delay, s/veh	36.2		8.8			13.9		
Approach LOS	D		A			B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.6	59.2				66.8		23.2
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	9.0	37.0				50.0		32.0
Max Q Clear Time (g_c+I1), s	4.6	10.5				16.8		17.1
Green Ext Time (p_c), s	0.0	12.9				14.3		2.1
Intersection Summary								
HCM 2010 Ctrl Delay			18.3					
HCM 2010 LOS			B					







Queues
5: Del Monte Ave & Contra Coasta Ave

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	39	190	249	544	839
v/c Ratio	0.25	0.61	0.72	0.19	0.41
Control Delay	40.8	14.5	45.0	1.9	12.2
Queue Delay	0.0	0.0	3.2	0.3	0.0
Total Delay	40.8	14.5	48.2	2.2	12.2
Queue Length 50th (ft)	21	0	150	21	122
Queue Length 95th (ft)	49	59	229	43	220
Internal Link Dist (ft)	234			178	366
Turn Bay Length (ft)	130		90		
Base Capacity (vph)	472	561	424	2909	2025
Starvation Cap Reductn	0	0	97	1712	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.34	0.76	0.45	0.41
Intersection Summary					
















HCM 2010 Signalized Intersection Summary
5: Del Monte Ave & Contra Coasta Ave

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	38	186	244	533	726	96		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900		
Adj Flow Rate, veh/h	39	190	249	544	741	98		
Adj No. of Lanes	1	1	1	2	2	0		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	256	229	289	2714	1758	232		
Arrive On Green	0.14	0.14	0.16	0.77	0.56	0.56		
Sat Flow, veh/h	1774	1583	1774	3632	3237	416		
Grp Volume(v), veh/h	39	190	249	544	417	422		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1789		
Q Serve(g_s), s	1.7	10.5	12.3	3.8	12.2	12.2		
Cycle Q Clear(g_c), s	1.7	10.5	12.3	3.8	12.2	12.2		
Prop In Lane	1.00	1.00	1.00			0.23		
Lane Grp Cap(c), veh/h	256	229	289	2714	990	1001		
V/C Ratio(X)	0.15	0.83	0.86	0.20	0.42	0.42		
Avail Cap(c_a), veh/h	473	422	414	2714	990	1001		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.96	0.96	1.00	1.00		
Uniform Delay (d), s/veh	33.7	37.4	36.7	2.9	11.4	11.4		
Incr Delay (d2), s/veh	0.3	7.6	11.7	0.2	1.3	1.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	0.9	9.2	7.0	1.9	6.3	6.3		
LnGrp Delay(d),s/veh	34.0	45.0	48.3	3.1	12.8	12.7		
LnGrp LOS	C	D	D	A	B	B		
Approach Vol, veh/h	229		793		839			
Approach Delay, s/veh	43.2		17.3		12.7			
Approach LOS	D		B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	73.0		17.0		18.7		54.3	
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0	
Max Green Setting (Gmax), s	58.0		24.0		21.0		33.0	
Max Q Clear Time (g_c+I1), s	5.8		12.5		14.3		14.2	
Green Ext Time (p_c), s	12.4		0.5		0.4		8.8	
Intersection Summary								
HCM 2010 Ctrl Delay			18.4					
HCM 2010 LOS			B					






Queues
3: Broadway Ave & Del Monte Ave

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	434	143	1107	576	125	803
v/c Ratio	0.69	0.35	0.56	0.62	0.57	0.31
Control Delay	39.8	8.4	15.3	16.2	44.2	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	39.8	8.4	15.3	16.2	44.2	2.0
Queue Length 50th (ft)	120	2	201	175	48	16
Queue Length 95th (ft)	159	47	311	343	96	34
Internal Link Dist (ft)	417		273			178
Turn Bay Length (ft)		75		5	80	
Base Capacity (vph)	915	524	1973	923	240	2571
Starvation Cap Reductn	0	0	0	0	0	886
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.27	0.56	0.62	0.52	0.48
Intersection Summary						













HCM 2010 Signalized Intersection Summary
 3: Broadway Ave & Del Monte Ave

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			 		
Volume (veh/h)	399	132	1018	530	115	739		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	434	0	1107	0	125	803		
Adj No. of Lanes	2	1	2	1	1	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	543	250	2202	985	154	2666		
Arrive On Green	0.16	0.00	0.62	0.00	0.17	1.00		
Sat Flow, veh/h	3442	1583	3632	1583	1774	3632		
Grp Volume(v), veh/h	434	0	1107	0	125	803		
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1583	1774	1770		
Q Serve(g_s), s	10.9	0.0	15.5	0.0	6.1	0.0		
Cycle Q Clear(g_c), s	10.9	0.0	15.5	0.0	6.1	0.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	543	250	2202	985	154	2666		
V/C Ratio(X)	0.80	0.00	0.50	0.00	0.81	0.30		
Avail Cap(c_a), veh/h	918	422	2202	985	217	2666		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00		
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.92	0.92		
Uniform Delay (d), s/veh	36.5	0.0	9.3	0.0	36.5	0.0		
Incr Delay (d2), s/veh	2.8	0.0	0.8	0.0	13.5	0.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	5.4	0.0	7.8	0.0	3.6	0.1		
LnGrp Delay(d),s/veh	39.3	0.0	10.2	0.0	50.0	0.3		
LnGrp LOS	D		B		D	A		
Approach Vol, veh/h	434		1107			928		
Approach Delay, s/veh	39.3		10.2			7.0		
Approach LOS	D		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.8	60.0				71.8		18.2
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	11.0	43.0				58.0		24.0
Max Q Clear Time (g_c+I1), s	8.1	17.5				2.0		12.9
Green Ext Time (p_c), s	0.1	15.5				22.8		1.3
Intersection Summary								
HCM 2010 Ctrl Delay			14.1					
HCM 2010 LOS			B					

Queues
5: Del Monte Ave & Contra Coasta Ave

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	74	226	118	1074	738
v/c Ratio	0.41	0.62	0.53	0.38	0.33
Control Delay	43.5	13.1	41.3	3.2	8.7
Queue Delay	0.0	0.0	0.0	0.4	0.0
Total Delay	43.5	13.1	41.3	3.6	8.7
Queue Length 50th (ft)	40	0	72	62	88
Queue Length 95th (ft)	79	63	127	122	157
Internal Link Dist (ft)	234			178	366
Turn Bay Length (ft)	130		90		
Base Capacity (vph)	550	648	297	2859	2238
Starvation Cap Reductn	0	0	0	1141	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.13	0.35	0.40	0.63	0.33
Intersection Summary					

HCM 2010 Signalized Intersection Summary
5: Del Monte Ave & Contra Coasta Ave

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	73	221	116	1053	668	55		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900		
Adj Flow Rate, veh/h	74	226	118	1074	682	56		
Adj No. of Lanes	1	1	1	2	2	0		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	300	268	150	2625	2030	167		
Arrive On Green	0.17	0.17	0.08	0.74	0.61	0.61		
Sat Flow, veh/h	1774	1583	1774	3632	3406	272		
Grp Volume(v), veh/h	74	226	118	1074	364	374		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1815		
Q Serve(g_s), s	3.3	12.4	5.9	10.1	9.0	9.0		
Cycle Q Clear(g_c), s	3.3	12.4	5.9	10.1	9.0	9.0		
Prop In Lane	1.00	1.00	1.00			0.15		
Lane Grp Cap(c), veh/h	300	268	150	2625	1085	1112		
V/C Ratio(X)	0.25	0.84	0.79	0.41	0.34	0.34		
Avail Cap(c_a), veh/h	552	493	296	2625	1085	1112		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(l)	1.00	1.00	0.83	0.83	1.00	1.00		
Uniform Delay (d), s/veh	32.4	36.2	40.4	4.3	8.5	8.5		
Incr Delay (d2), s/veh	0.4	7.1	7.4	0.4	0.8	0.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%),veh/ln	1.6	10.8	3.2	5.1	4.6	4.7		
LnGrp Delay(d),s/veh	32.8	43.3	47.8	4.7	9.3	9.3		
LnGrp LOS	C	D	D	A	A	A		
Approach Vol, veh/h	300		1192		738			
Approach Delay, s/veh	40.7		9.0		9.3			
Approach LOS	D		A		A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	70.8		19.2		11.6		59.2	
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0	
Max Green Setting (Gmax), s	54.0		28.0		15.0		35.0	
Max Q Clear Time (g_c+I1), s	12.1		14.4		7.9		11.0	
Green Ext Time (p_c), s	18.5		0.8		0.1		13.9	
Intersection Summary								
HCM 2010 Ctrl Delay			13.4					
HCM 2010 LOS			B					

BROADWAY AVENUE AT DEL MONTE BOULEVARD

Sidra Outputs

LANE SUMMARY

 **Site: Broadway 2012 Proposed AM - Final**

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Blvd													
Lane 1	429	2.0	1350	0.318	100	5.5	LOS A	1.8	44.9	Full	1150	0.0	0.0
Lane 2 ^d	429	2.0	1350	0.318	100	5.5	LOS A	1.8	44.9	Full	1150	0.0	0.0
Approach	858	2.0		0.318		5.5	LOS A	1.8	44.9				
East: Broadway Ave													
Lane 1 ^d	536	2.0	981	0.546	100	10.7	LOS B	3.3	83.1	Full	1060	0.0	0.0
Lane 2	93	2.0	928	0.101	100	4.8	LOS A	0.4	10.4	Full	1060	0.0	0.0
Approach	629	2.0		0.546		9.9	LOS A	3.3	83.1				
North: Del Monte Blvd													
Lane 1	425	2.0	817	0.520	100	11.7	LOS B	3.3	84.7	Full	200	0.0	0.0
Lane 2 ^d	425	2.0	817	0.520	100	11.7	LOS B	3.3	84.7	Full	200	0.0	0.0
Approach	850	2.0		0.520		11.7	LOS B	3.3	84.7				
Intersection	2337	2.0		0.546		8.9	LOS A	3.3	84.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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INTERSECTION 6**

LANE SUMMARY

 Site: Broadway 2012 Proposed PM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Blvd													
Lane 1	746	2.0	1274	0.586	100	9.7	LOS A	4.6	116.3	Full	1150	0.0	0.0
Lane 2 ^d	746	2.0	1274	0.586	100	9.7	LOS A	4.6	116.3	Full	1150	0.0	0.0
Approach	1492	2.0		0.586		9.7	LOS A	4.6	116.3				
East: Broadway Ave													
Lane 1 ^d	385	2.0	708	0.543	100	13.7	LOS B	3.0	75.5	Full	1060	0.0	0.0
Lane 2	127	2.0	646	0.197	100	7.9	LOS A	0.8	20.3	Full	1060	0.0	0.0
Approach	512	2.0		0.543		12.2	LOS B	3.0	75.5				
North: Del Monte Blvd													
Lane 1	412	2.0	953	0.432	100	8.8	LOS A	2.4	61.4	Full	130	0.0	0.0
Lane 2 ^d	412	2.0	953	0.432	100	8.8	LOS A	2.4	61.4	Full	130	0.0	0.0
Approach	824	2.0		0.432		8.8	LOS A	2.4	61.4				
Intersection	2828	2.0		0.586		9.9	LOS A	4.6	116.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: Contra Costa 2012 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Blvd													
Lane 1	355	2.0	1369	0.260	100	4.8	LOS A	1.4	36.7	Full	200	0.0	0.0
Lane 2 ^d	355	2.0	1369	0.260	100	4.8	LOS A	1.4	36.7	Full	200	0.0	0.0
Approach	711	2.0		0.260		4.8	LOS A	1.4	36.7				
North: Del Monte Blvd													
Lane 1 ^d	777	2.0	1207	0.644	100	11.4	LOS B	4.6	115.9	Full	920	0.0	0.0
Approach	777	2.0		0.644		11.4	LOS B	4.6	115.9				
West: Contra Costa St													
Lane 1 ^d	180	2.0	691	0.261	100	8.3	LOS A	1.1	28.5	Full	820	0.0	0.0
Approach	180	2.0		0.261		8.3	LOS A	1.1	28.5				
Intersection	1668	2.0		0.644		8.3	LOS A	4.6	115.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: Contra Costa 2012 Proposed PM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Blvd													
Lane 1	554	2.0	1330	0.417	100	6.7	LOS A	2.8	71.8	Full	150	0.0	0.0
Lane 2 ^d	554	2.0	1330	0.417	100	6.7	LOS A	2.8	71.8	Full	150	0.0	0.0
Approach	1109	2.0		0.417		6.7	LOS A	2.8	71.8				
North: Del Monte Blvd													
Lane 1 ^d	689	2.0	1306	0.528	100	8.4	LOS A	3.4	87.6	Full	1600	0.0	0.0
Approach	689	2.0		0.528		8.4	LOS A	3.4	87.6				
West: Contra Costa St													
Lane 1 ^d	237	2.0	732	0.324	100	8.9	LOS A	1.5	37.3	Full	1600	0.0	0.0
Approach	237	2.0		0.324		8.9	LOS A	1.5	37.3				
Intersection	2035	2.0		0.528		7.5	LOS A	3.4	87.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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INTERSECTION 6**

LANE SUMMARY

 Site: Broadway 2027 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Blvd													
Lane 1	483	2.0	1342	0.360	100	6.0	LOS A	2.2	54.9	Full	1150	0.0	0.0
Lane 2 ^d	483	2.0	1342	0.360	100	6.0	LOS A	2.2	54.9	Full	1150	0.0	0.0
Approach	966	2.0		0.360		6.0	LOS A	2.2	54.9				
East: Broadway Ave													
Lane 1 ^d	604	2.0	919	0.658	100	14.4	LOS B	4.6	117.0	Full	1060	0.0	0.0
Lane 2	105	2.0	863	0.122	100	5.4	LOS A	0.5	12.6	Full	1060	0.0	0.0
Approach	710	2.0		0.658		13.1	LOS B	4.6	117.0				
North: Del Monte Blvd													
Lane 1	479	2.0	762	0.628	100	15.5	LOS C	4.7	119.3	Full	130	0.0	2.5
Lane 2 ^d	479	2.0	762	0.628	100	15.5	LOS C	4.7	119.3	Full	130	0.0	2.5
Approach	958	2.0		0.628		15.5	LOS C	4.7	119.3				
Intersection	2634	2.0		0.658		11.3	LOS B	4.7	119.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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INTERSECTION 6**

LANE SUMMARY

 Site: Broadway 2027 Proposed PM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Blvd													
Lane 1	841	2.0	1255	0.670	100	11.8	LOS B	6.2	156.9	Full	1150	0.0	0.0
Lane 2 ^d	841	2.0	1255	0.670	100	11.8	LOS B	6.2	156.9	Full	1150	0.0	0.0
Approach	1683	2.0		0.670		11.8	LOS B	6.2	156.9				
East: Broadway Ave													
Lane 1 ^d	434	2.0	626	0.693	100	21.1	LOS C	4.5	114.3	Full	1060	0.0	0.0
Lane 2	143	2.0	564	0.255	100	9.8	LOS A	1.0	26.3	Full	1060	0.0	0.0
Approach	577	2.0		0.693		18.3	LOS C	4.5	114.3				
North: Del Monte Blvd													
Lane 1	464	2.0	907	0.512	100	10.6	LOS B	3.3	85.0	Full	130	0.0	0.0
Lane 2 ^d	464	2.0	907	0.512	100	10.6	LOS B	3.3	85.0	Full	130	0.0	0.0
Approach	928	2.0		0.512		10.6	LOS B	3.3	85.0				
Intersection	3188	2.0		0.693		12.7	LOS B	6.2	156.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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INTERSECTION 6**

LANE SUMMARY

 Site: Contra Costa 2027 Proposed AM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows			Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	Cap. veh/h					Veh	Dist ft				
South: Del Monte Blvd													
Lane 1	422	2.0	1354	0.312	100	5.4	LOS A	1.8	46.9	Full	150	0.0	0.0
Lane 2 ^d	422	2.0	1354	0.312	100	5.4	LOS A	1.8	46.9	Full	150	0.0	0.0
Approach	845	2.0		0.312		5.4	LOS A	1.8	46.9				
North: Del Monte Blvd													
Lane 1 ^d	893	2.0	1140	0.784	100	17.4	LOS C	6.8	172.2	Full	1600	0.0	0.0
Approach	893	2.0		0.784		17.4	LOS C	6.8	172.2				
West: Contra Costa St													
Lane 1 ^d	243	2.0	631	0.386	100	11.2	LOS B	1.9	47.2	Full	1600	0.0	0.0
Approach	243	2.0		0.386		11.2	LOS B	1.9	47.2				
Intersection	1982	2.0		0.784		11.5	LOS B	6.8	172.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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INTERSECTION 6**

LANE SUMMARY

 Site: Contra Costa 2027 Proposed PM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Del Monte Blvd													
Lane 1	635	2.2	1298	0.489	100	7.8	LOS A	3.6	92.3	Full	150	0.0	0.0
Lane 2 ^d	636	2.0	1301	0.489	100	7.8	LOS A	3.6	92.5	Full	150	0.0	0.0
Approach	1271	2.1		0.489		7.8	LOS A	3.6	92.5				
North: Del Monte Blvd													
Lane 1 ^d	786	2.1	1266	0.621	100	10.5	LOS B	4.8	120.9	Full	1600	0.0	0.0
Approach	786	2.1		0.621		10.5	LOS B	4.8	120.9				
West: Contra Costa St													
Lane 1 ^d	320	3.0	667	0.479	100	12.7	LOS B	2.6	67.6	Full	1600	0.0	0.0
Approach	320	3.0		0.479		12.7	LOS B	2.6	67.6				
Intersection	2376	2.2		0.621		9.4	LOS A	4.8	120.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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SIDRA
INTERSECTION 6

BROADWAY AVENUE AT ALHAMBRA STREET

Capital Cost Worksheet

City of Seaside						Capital Cost Worksheet	
SEA_02		Broadway Avenue at Alhambra Street					
Capital Cost				Project Constants			
B/C Target	SIGNAL (a)	ROUNDABOUT (b)	Added Cost for Roundabout (c) = (b - a)	Added O&M Cost for Roundabout (d)	Total Benefits (e)	Total Costs (f) = (c + d)	B/C (g) = (e / f)
Actual	\$ 1,046,650	\$ 1,221,775	\$ 175,125	\$ (73,545)	\$ 470,320	\$ 101,580	4.63
High	\$ 1,151,315	\$ 1,099,598	\$ (51,718)			\$ (125,263)	(3.75)
Low	\$ 941,985	\$ 1,343,953	\$ 401,968			\$ 328,423	1.43
Breakeven	\$ 1,046,650	\$ 1,590,515	\$ 543,865			\$ 470,320	1.00
Custom 1	\$ 1,046,650	\$ 1,821,775	\$ 775,125			\$ 701,580	0.67
Custom 2							

Capital Cost Relationship (B/C=1.00)			Cost Sensitivity Assumptions		
SIGNAL	ROUNDABOUT		Percent Adjustment to Cost		
B/C Target	Signal	Roundabout			
	\$ -	\$ 800,000	High	10%	-10%
	\$ 456,135	\$ 1,000,000	Low	-10%	10%
	\$ 656,135	\$ 1,200,000	Breakeven	0%	30%
	\$ 856,135	\$ 1,400,000	Custom 1		
	\$ 1,056,135	\$ 1,600,000	Custom 2		
	\$ 1,256,135	\$ 1,800,000			
	\$ 1,456,135	\$ 2,000,000			
	\$ 1,656,135	\$ 2,200,000			
	\$ 1,856,135	\$ 2,400,000			
	\$ 2,056,135	\$ 2,600,000			

Chart Assumptions		
Cost Increase	\$	200,000 (x axis major unit)
Min Signal Cost	\$	400,000 (Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS

BROADWAY AVENUE AT ALHAMBRA STREET

Turning Movement Volumes

EXISTING												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	12	5	11	20	408	8	29	2	18	13	614	16
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
Source: Fehr & Peers West Broadway Avenue Corridor Transportation Analysis (December 2011), 2011												

CUMULATIVE												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	30	5	33	43	523	38	79	2	39	23	684	21
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Pedestrians												
Bicycles												
Source: Fehr & Peers West Broadway Avenue Corridor Transportation Analysis (December 2011), 2027												

BROADWAY AVENUE AT ALHAMBRA STREET

Synchro Outputs

Intersection												
Intersection Delay, s/veh	12.4											
Intersection LOS	B											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	13	614	16	0	20	408	8	0	12	5	11
Future Vol, veh/h	0	13	614	16	0	20	408	8	0	12	5	11
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	0	14	667	17	0	22	443	9	0	13	5	12
Number of Lanes	0	0	2	0	0	0	2	0	0	0	1	0
Approach	EB			WB				NB				
Opposing Approach	WB			EB				SB				
Opposing Lanes	2			2				1				
Conflicting Approach Left	SB			NB				EB				
Conflicting Lanes Left	1			1				2				
Conflicting Approach Right	NB			SB				WB				
Conflicting Lanes Right	1			1				2				
HCM Control Delay	13.4			11.4				9.6				
HCM LOS	B			B				A				
Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1						
Vol Left, %	43%	4%	0%	9%	0%	59%						
Vol Thru, %	18%	96%	95%	91%	96%	4%						
Vol Right, %	39%	0%	5%	0%	4%	37%						
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop						
Traffic Vol by Lane	28	320	323	224	212	49						
LT Vol	12	13	0	20	0	29						
Through Vol	5	307	307	204	204	2						
RT Vol	11	0	16	0	8	18						
Lane Flow Rate	30	348	351	243	230	53						
Geometry Grp	2	7	7	7	7	2						
Degree of Util (X)	0.053	0.509	0.509	0.374	0.349	0.092						
Departure Headway (Hd)	6.261	5.271	5.216	5.528	5.456	6.237						
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes						
Cap	575	678	685	645	652	578						
Service Time	4.263	3.052	2.997	3.318	3.247	4.238						
HCM Lane V/C Ratio	0.052	0.513	0.512	0.377	0.353	0.092						
HCM Control Delay	9.6	13.5	13.4	11.6	11.2	9.9						
HCM Lane LOS	A	B	B	B	B	A						
HCM 95th-tile Q	0.2	2.9	2.9	1.7	1.6	0.3						

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	29	2	18
Future Vol, veh/h	0	29	2	18
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	32	2	20
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		1		
Conflicting Approach Left		WB		
Conflicting Lanes Left		2		
Conflicting Approach Right		EB		
Conflicting Lanes Right		2		
HCM Control Delay		9.9		
HCM LOS		A		
Lane				

Queues

3: Broadway Ave & Alhambra St

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	698	474	30	54
v/c Ratio	0.46	0.32	0.05	0.09
Control Delay	4.5	3.4	9.9	9.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	3.4	9.9	9.4
Queue Length 50th (ft)	0	0	1	1
Queue Length 95th (ft)	161	91	19	28
Internal Link Dist (ft)	305	325	166	178
Turn Bay Length (ft)				
Base Capacity (vph)	1754	1707	1335	1326
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	0.40	0.28	0.02	0.04
Intersection Summary				

HCM 2010 Signalized Intersection Summary
3: Broadway Ave & Alhambra St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	13	614	16	20	408	8	12	5	11	29	2	18
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	1.00		0.96	0.94		0.95	0.95		0.92
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	14	667	17	22	443	9	13	5	12	32	2	20
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	124	1075	27	138	1052	21	223	74	88	273	41	77
Arrive On Green	0.60	0.60	0.60	0.60	0.60	0.60	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	11	1786	45	30	1747	34	406	520	618	629	287	539
Grp Volume(v), veh/h	698	0	0	474	0	0	30	0	0	54	0	0
Grp Sat Flow(s),veh/h/ln	1842	0	0	1811	0	0	1544	0	0	1455	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.5	0.0	0.0	4.3	0.0	0.0	0.5	0.0	0.0	0.9	0.0	0.0
Prop In Lane	0.02		0.02	0.05		0.02	0.43		0.40	0.59		0.37
Lane Grp Cap(c), veh/h	1226	0	0	1210	0	0	385	0	0	391	0	0
V/C Ratio(X)	0.57	0.00	0.00	0.39	0.00	0.00	0.08	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	2162	0	0	2105	0	0	967	0	0	944	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(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.0	0.0	0.0	3.3	0.0	0.0	11.7	0.0	0.0	11.9	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.2	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(-26165%),veh/ln	3.8	0.0	0.0	2.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
LnGrp Delay(d),s/veh	4.4	0.0	0.0	3.5	0.0	0.0	11.8	0.0	0.0	12.1	0.0	0.0
LnGrp LOS	A			A			B			B		
Approach Vol, veh/h		698			474			30				54
Approach Delay, s/veh		4.4			3.5			11.8				12.1
Approach LOS		A			A			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		8.5		22.9		8.5		22.9				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		17.0		35.0		17.0		35.0				
Max Q Clear Time (g_c+I1), s		2.5		9.5		2.9		6.3				
Green Ext Time (p_c), s		0.3		9.3		0.3		9.7				
Intersection Summary												
HCM 2010 Ctrl Delay				4.6								
HCM 2010 LOS				A								

Intersection												
Intersection Delay, s/veh	18.6											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	23	684	21	0	43	523	38	0	30	5	33
Future Vol, veh/h	0	23	684	21	0	43	523	38	0	30	5	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	25	743	23	0	47	568	41	0	33	5	36
Number of Lanes	0	0	2	0	0	0	2	0	0	0	1	0
Approach	EB			WB				NB				
Opposing Approach	WB			EB				SB				
Opposing Lanes	2			2				1				
Conflicting Approach Left	SB			NB				EB				
Conflicting Lanes Left	1			1				2				
Conflicting Approach Right	NB			SB				WB				
Conflicting Lanes Right	1			1				2				
HCM Control Delay	21.2			17.6				11.4				
HCM LOS	C			C				B				
Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1						
Vol Left, %	44%	6%	0%	14%	0%	66%						
Vol Thru, %	7%	94%	94%	86%	87%	2%						
Vol Right, %	49%	0%	6%	0%	13%	33%						
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop						
Traffic Vol by Lane	68	365	363	305	300	120						
LT Vol	30	23	0	43	0	79						
Through Vol	5	342	342	262	262	2						
RT Vol	33	0	21	0	38	39						
Lane Flow Rate	74	397	395	331	326	130						
Geometry Grp	2	7	7	7	7	2						
Degree of Util (X)	0.145	0.686	0.674	0.591	0.567	0.253						
Departure Headway (Hd)	7.07	6.225	6.152	6.428	6.266	6.977						
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes						
Cap	505	579	584	559	573	513						
Service Time	5.151	3.993	3.92	4.201	4.038	5.044						
HCM Lane V/C Ratio	0.147	0.686	0.676	0.592	0.569	0.253						
HCM Control Delay	11.4	21.6	20.8	18.2	17	12.4						
HCM Lane LOS	B	C	C	C	C	B						
HCM 95th-tile Q	0.5	5.3	5.1	3.8	3.5	1						

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	79	2	39
Future Vol, veh/h	0	79	2	39
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	86	2	42
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		1		
Conflicting Approach Left		WB		
Conflicting Lanes Left		2		
Conflicting Approach Right		EB		
Conflicting Lanes Right		2		
HCM Control Delay		12.4		
HCM LOS		B		
Lane				

Queues

3: Broadway Ave & Alhambra St

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	791	656	74	130
v/c Ratio	0.66	0.58	0.18	0.34
Control Delay	9.6	8.2	11.1	14.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.6	8.2	11.1	14.7
Queue Length 50th (ft)	98	73	6	15
Queue Length 95th (ft)	267	202	38	66
Internal Link Dist (ft)	305	325	166	178
Turn Bay Length (ft)				
Base Capacity (vph)	1589	1499	789	715
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	0.50	0.44	0.09	0.18
Intersection Summary				

HCM 2010 Signalized Intersection Summary

3: Broadway Ave & Alhambra St

TAMC Regional ICE - Seaside
Proposed PM (2027)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	23	684	21	43	523	38	30	5	33	79	2	39
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	25	743	23	47	568	41	33	5	36	86	2	42
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	1137	34	143	1024	71	215	39	107	291	10	66
Arrive On Green	0.65	0.65	0.65	0.65	0.65	0.65	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	22	1750	53	59	1576	109	553	295	804	965	76	497
Grp Volume(v), veh/h	791	0	0	656	0	0	74	0	0	130	0	0
Grp Sat Flow(s),veh/h/ln	1825	0	0	1745	0	0	1652	0	0	1537	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	0.0	7.1	0.0	0.0	1.4	0.0	0.0	2.8	0.0	0.0
Prop In Lane	0.03		0.03	0.07		0.06	0.45		0.49	0.66		0.32
Lane Grp Cap(c), veh/h	1287	0	0	1238	0	0	361	0	0	367	0	0
V/C Ratio(X)	0.61	0.00	0.00	0.53	0.00	0.00	0.20	0.00	0.00	0.35	0.00	0.00
Avail Cap(c_a), veh/h	1868	0	0	1776	0	0	809	0	0	797	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(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	3.9	0.0	0.0	3.5	0.0	0.0	14.5	0.0	0.0	15.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.6	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(-26165%),veh/ln	4.8	0.0	0.0	3.6	0.0	0.0	0.7	0.0	0.0	1.3	0.0	0.0
LnGrp Delay(d),s/veh	4.4	0.0	0.0	3.9	0.0	0.0	14.8	0.0	0.0	15.6	0.0	0.0
LnGrp LOS	A			A			B			B		
Approach Vol, veh/h		791			656			74				130
Approach Delay, s/veh		4.4			3.9			14.8				15.6
Approach LOS		A			A			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		8.9		28.0		8.9		28.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		16.0		36.0		16.0		36.0				
Max Q Clear Time (g_c+I1), s		3.4		11.6		4.8		9.1				
Green Ext Time (p_c), s		0.9		12.3		0.8		13.0				
Intersection Summary												
HCM 2010 Ctrl Delay				5.5								
HCM 2010 LOS				A								

BROADWAY AVENUE AT ALHAMBRA STREET

Sidra Outputs

LANE SUMMARY

 Site: 2011 Proposed PM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Alhambra St													
Lane 1 ^d	30	2.0	738	0.041	100	5.3	LOS A	0.1	3.7	Full	230	0.0	0.0
Approach	30	2.0		0.041		5.3	LOS A	0.1	3.7				
East: Broadway Avenue													
Lane 1 ^d	474	2.0	1368	0.347	100	5.8	LOS A	2.1	52.5	Full	1000	0.0	0.0
Approach	474	2.0		0.347		5.8	LOS A	2.1	52.5				
North: Alhambra Street													
Lane 1 ^d	53	2.0	922	0.058	100	4.4	LOS A	0.2	5.3	Full	700	0.0	0.0
Approach	53	2.0		0.058		4.4	LOS A	0.2	5.3				
West: Broadway Avenue													
Lane 1 ^d	699	2.0	1338	0.522	100	8.2	LOS A	4.0	102.4	Full	1060	0.0	0.0
Approach	699	2.0		0.522		8.2	LOS A	4.0	102.4				
Intersection	1257	2.0		0.522		7.1	LOS A	4.0	102.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2027 Proposed PM - Final

New Site
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Alhambra St													
Lane 1 ^d	74	2.0	625	0.118	100	7.1	LOS A	0.4	11.1	Full	230	0.0	0.0
Approach	74	2.0		0.118		7.1	LOS A	0.4	11.1				
East: Broadway Avenue													
Lane 1 ^d	657	2.0	1326	0.495	100	7.8	LOS A	3.7	93.9	Full	1000	0.0	0.0
Approach	657	2.0		0.495		7.8	LOS A	3.7	93.9				
North: Alhambra Street													
Lane 1 ^d	130	2.0	782	0.167	100	6.4	LOS A	0.6	16.3	Full	700	0.0	0.0
Approach	130	2.0		0.167		6.4	LOS A	0.6	16.3				
West: Broadway Avenue													
Lane 1 ^d	791	2.0	1237	0.640	100	11.1	LOS B	5.7	143.6	Full	1060	0.0	0.0
Approach	791	2.0		0.640		11.1	LOS B	5.7	143.6				
Intersection	1652	2.0		0.640		9.3	LOS A	5.7	143.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Regional Intersection Control Evaluation
Section 11:

City of Soledad

Appendix B11: Analysis Worksheets

Study Intersections:

- METZ ROAD AT PINNACLES PARKWAY (PROPOSED)
- FRONT STREET AT EAST STREET



METZ ROAD AT PINNACLES PARKWAY (PROPOSED)

Capital Cost Worksheet

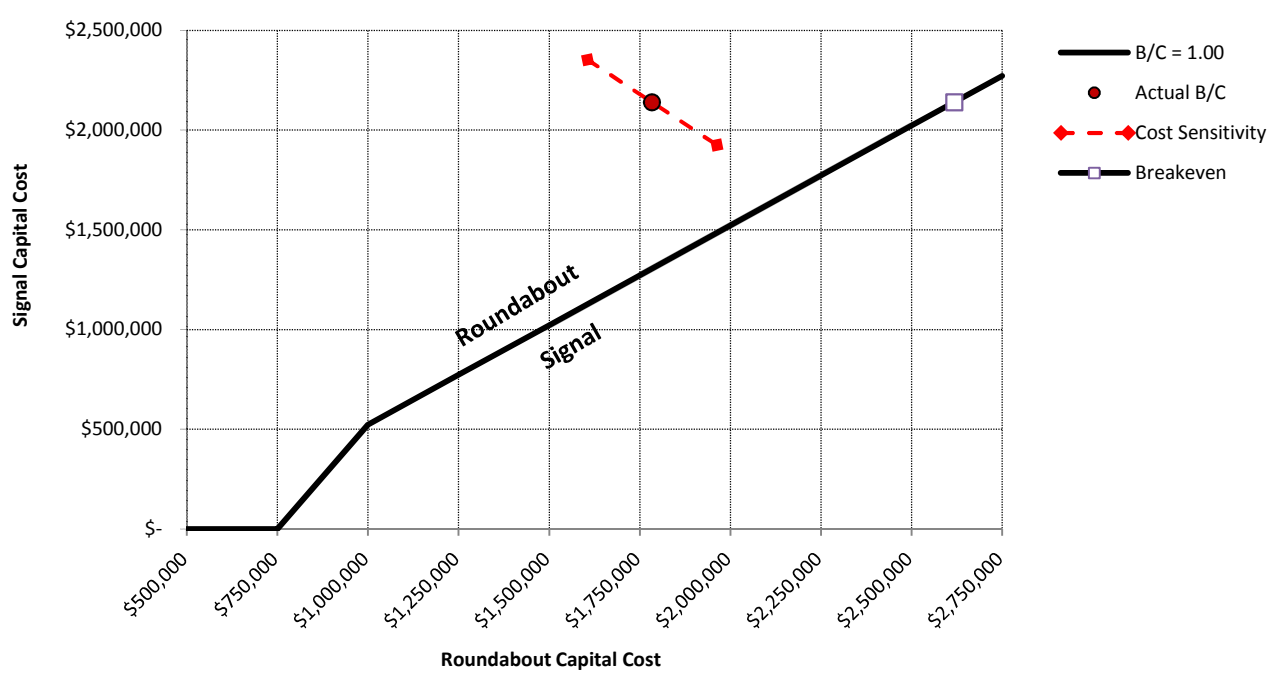
City of Soledad						Capital Cost Worksheet	
SOL_01		Metz Road at Pinnacles Parkway					
Capital Cost				Project Constants			
	SIGNAL	ROUNDAABOUT	Added Cost for Roundabout	Added O&M Cost for Roundabout	Total Benefits	Total Costs	B/C
B/C Target	(a)	(b)	(c) = (b - a)	(d)	(e)	(f) = (c + d)	(g) = (e / f)
Actual	\$ 2,140,100	\$ 1,783,700	\$ (356,400)	\$ (111,850)	\$ 365,802	\$ (468,250)	(0.78)
High	\$ 2,354,110	\$ 1,605,330	\$ (748,780)			\$ (860,630)	(0.43)
Low	\$ 1,926,090	\$ 1,962,070	\$ 35,980			\$ (75,870)	(4.82)
Breakeven	\$ 2,140,100	\$ 2,617,752	\$ 477,652			\$ 365,802	1.00
Custom 1							
Custom 2							

Capital Cost Relationship (B/C=1.00)			Cost Sensitivity Assumptions		
SIGNAL	ROUNDAABOUT		Percent Adjustment to Cost		
B/C Target	Signal	Roundabout	B/C Target	Signal	Roundabout
	\$ -	\$ 500,000	High	10%	-10%
	\$ -	\$ 750,000	Low	-10%	10%
	\$ 522,348	\$ 1,000,000	Breakeven	0%	47%
	\$ 772,348	\$ 1,250,000	Custom 1		
	\$ 1,022,348	\$ 1,500,000	Custom 2		
	\$ 1,272,348	\$ 1,750,000			
	\$ 1,522,348	\$ 2,000,000			
	\$ 1,772,348	\$ 2,250,000			
	\$ 2,022,348	\$ 2,500,000			
	\$ 2,272,348	\$ 2,750,000			

Chart Assumptions		
Cost Increase	\$ 250,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



METZ ROAD AT PINNACLES PARKWAY (PROPOSED)

Turning Movement Volumes

EXISTING												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	9	0	0	0	65	0	0	0	0	0	96	12
PHF	0.92	0	0.92	0.92	0.92	0	0	0	0	0	0.92	0.92
Truck %	8%	0%	8%	8%	8%	0%	0%	0%	0%	0%	8%	8%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	26	0	0	0	131	0	0	0	0	0	119	25
PHF	0.92	0	0.92	0.92	0.92	0	0	0	0	0	0.92	0.92
Truck %	8%	0%	8%	8%	8%	0%	0%	0%	0%	0%	8%	8%
Pedestrians												
Bicycles												

Source: Soledad Business Park TIA (2013), 2015

CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	180	0	10	10	186	0	0	0	0	0	94	340
PHF	0.92	0	0.92	0.92	0.92	0	0	0	0	0	0.92	0.92
Truck %	8%	0%	8%	8%	8%	0%	0%	0%	0%	0%	8%	8%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	507	0	10	10	154	0	0	0	0	0	229	287
PHF	0.92	0	0.92	0.92	0.92	0	0	0	0	0	0.92	0.92
Truck %	8%	0%	8%	8%	8%	0%	0%	0%	0%	0%	8%	8%
Pedestrians												
Bicycles												

Source: Soledad Business Park TIA (2013), 2035

CUMULATIVE - With Galbian Extension												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	180	51	10	10	186	5	5	97	5	5	94	340
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Pedestrians												
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	507	144	10	10	154	4	5	126	5	5	229	287
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Truck %	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Pedestrians												
Bicycles												

Source: Soledad Business Park TIA (2013), 2035

METZ ROAD AT PINNACLES PARKWAY (PROPOSED)

Synchro Outputs

Intersection

Int Delay, s/veh 0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	96	12	5	65	9	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	104	13	5	71	10	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	117
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.18
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.272
Pot Cap-1 Maneuver	-	-	1435
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1435
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	826	-	-	1435	-
HCM Lane V/C Ratio	0.018	-	-	0.004	-
HCM Control Delay (s)	9.4	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection

Int Delay, s/veh 1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	119	25	5	131	26	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	129	27	5	142	28	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	157
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.18
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.272
Pot Cap-1 Maneuver	-	-	1387
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1387
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	707	-	-	1387	-
HCM Lane V/C Ratio	0.048	-	-	0.004	-
HCM Control Delay (s)	10.3	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection

Int Delay, s/veh 3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	94	340	10	186	180	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	102	370	11	202	196	11

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	472
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.18
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.272
Pot Cap-1 Maneuver	-	-	1059
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1059
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	515	-	-	1059	-
HCM Lane V/C Ratio	0.401	-	-	0.01	-
HCM Control Delay (s)	16.6	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.9	-	-	0	-

Intersection

Int Delay, s/veh 64.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	229	287	10	154	507	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	249	312	11	167	551	11

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	561
Stage 1	-	-	405
Stage 2	-	-	189
Critical Hdwy	-	4.18	6.48
Critical Hdwy Stg 1	-	-	5.48
Critical Hdwy Stg 2	-	-	5.48
Follow-up Hdwy	-	2.272	3.372
Pot Cap-1 Maneuver	-	981	~ 458
Stage 1	-	-	661
Stage 2	-	-	829
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	981	~ 453
Mov Cap-2 Maneuver	-	-	~ 453
Stage 1	-	-	661
Stage 2	-	-	819

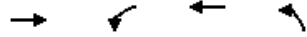
Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	149.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	456	-	-	981	-
HCM Lane V/C Ratio	1.232	-	-	0.011	-
HCM Control Delay (s)	149.5	-	-	8.7	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	22.6	-	-	0	-

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues
3: Los Coches Drive & Metz Road



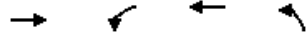
Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	117	5	71	15
v/c Ratio	0.21	0.01	0.13	0.01
Control Delay	5.3	4.4	5.3	4.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.3	4.4	5.3	4.5
Queue Length 50th (ft)	3	0	2	0
Queue Length 95th (ft)	16	2	11	5
Internal Link Dist (ft)	384		892	566
Turn Bay Length (ft)		50		
Base Capacity (vph)	1733	1759	1759	1518
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	0.07	0.00	0.04	0.01

Intersection Summary

HCM 2010 Signalized Intersection Summary
 3: Los Coches Drive & Metz Road

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↗		↖	↗	↖	↗		
Traffic Volume (veh/h)	96	12	5	65	9	5		
Future Volume (veh/h)	96	12	5	65	9	5		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1900	1759	1759	1759	1900		
Adj Flow Rate, veh/h	104	13	5	71	10	5		
Adj No. of Lanes	1	0	1	1	0	0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	8	8	8	8	0	0		
Cap, veh/h	234	29	618	269	286	143		
Arrive On Green	0.15	0.15	0.15	0.15	0.28	0.28		
Sat Flow, veh/h	1534	192	1199	1759	1012	506		
Grp Volume(v), veh/h	0	117	5	71	16	0		
Grp Sat Flow(s),veh/h/ln	0	1725	1199	1759	1619	0		
Q Serve(g_s), s	0.0	0.9	0.1	0.5	0.1	0.0		
Cycle Q Clear(g_c), s	0.0	0.9	0.9	0.5	0.1	0.0		
Prop In Lane		0.11	1.00		0.62	0.31		
Lane Grp Cap(c), veh/h	0	263	618	269	457	0		
V/C Ratio(X)	0.00	0.44	0.01	0.26	0.03	0.00		
Avail Cap(c_a), veh/h	0	3777	3060	3851	2401	0		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	0.0	5.5	5.9	5.3	3.7	0.0		
Incr Delay (d2), s/veh	0.0	1.2	0.0	0.5	0.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.0	0.3	0.0	0.0		
LnGrp Delay(d),s/veh	0.0	6.6	5.9	5.8	3.7	0.0		
LnGrp LOS		A	A	A	A			
Approach Vol, veh/h	117			76	16			
Approach Delay, s/veh	6.6			5.8	3.7			
Approach LOS	A			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		8.0		6.2				6.2
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		21.0		31.0				31.0
Max Q Clear Time (g_c+I1), s		2.1		2.9				2.9
Green Ext Time (p_c), s		0.0		1.1				1.1
Intersection Summary								
HCM 2010 Ctrl Delay			6.1					
HCM 2010 LOS			A					
Notes								
User approved volume balancing among the lanes for turning movement.								

Queues
3: Los Coches Drive & Metz Road



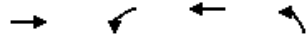
Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	156	5	142	33
v/c Ratio	0.26	0.01	0.24	0.03
Control Delay	5.4	4.6	5.9	5.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.4	4.6	5.9	5.5
Queue Length 50th (ft)	8	0	8	2
Queue Length 95th (ft)	21	2	21	8
Internal Link Dist (ft)	384		892	566
Turn Bay Length (ft)		50		
Base Capacity (vph)	1719	1599	1759	1601
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	0.09	0.00	0.08	0.02

Intersection Summary

HCM 2010 Signalized Intersection Summary
3: Los Coches Drive & Metz Road

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↖		↘	↖	↘	↘		
Traffic Volume (veh/h)	119	25	5	131	26	5		
Future Volume (veh/h)	119	25	5	131	26	5		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1900	1759	1759	1759	1900		
Adj Flow Rate, veh/h	129	27	5	142	28	5		
Adj No. of Lanes	1	0	1	1	0	0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	8	8	8	8	0	0		
Cap, veh/h	339	71	645	422	344	61		
Arrive On Green	0.24	0.24	0.24	0.24	0.25	0.25		
Sat Flow, veh/h	1412	295	1158	1759	1358	242		
Grp Volume(v), veh/h	0	156	5	142	34	0		
Grp Sat Flow(s),veh/h/ln	0	1707	1158	1759	1649	0		
Q Serve(g_s), s	0.0	1.2	0.1	1.1	0.2	0.0		
Cycle Q Clear(g_c), s	0.0	1.2	1.3	1.1	0.2	0.0		
Prop In Lane		0.17	1.00		0.82	0.15		
Lane Grp Cap(c), veh/h	0	410	645	422	418	0		
V/C Ratio(X)	0.00	0.38	0.01	0.34	0.08	0.00		
Avail Cap(c_a), veh/h	0	3244	2567	3343	2297	0		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	0.0	5.0	5.5	5.0	4.5	0.0		
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.5	0.1	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.0	0.6	0.0	0.5	0.1	0.0		
LnGrp Delay(d),s/veh	0.0	5.6	5.6	5.4	4.6	0.0		
LnGrp LOS		A	A	A	A			
Approach Vol, veh/h	156			147	34			
Approach Delay, s/veh	5.6			5.4	4.6			
Approach LOS	A			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		8.0		7.8				7.8
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		22.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		2.2		3.2				3.3
Green Ext Time (p_c), s		0.0		1.9				1.9
Intersection Summary								
HCM 2010 Ctrl Delay			5.4					
HCM 2010 LOS			A					
Notes								
User approved volume balancing among the lanes for turning movement.								

Queues
3: Los Coches Drive & Metz Road



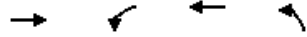
Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	472	11	202	207
v/c Ratio	0.59	0.04	0.32	0.38
Control Delay	5.3	6.3	7.9	9.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.3	6.3	7.9	9.8
Queue Length 50th (ft)	8	1	16	17
Queue Length 95th (ft)	49	7	52	66
Internal Link Dist (ft)	384		892	566
Turn Bay Length (ft)		50		
Base Capacity (vph)	1521	702	1683	1409
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	0.31	0.02	0.12	0.15

Intersection Summary

HCM 2010 Signalized Intersection Summary
 3: Los Coches Drive & Metz Road

	→	↘	↙	←	↖	↗			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	↗		↖	↗	↖				
Traffic Volume (veh/h)	94	340	10	186	180	10			
Future Volume (veh/h)	94	340	10	186	180	10			
Number	4	14	3	8	5	12			
Initial Q (Qb), veh	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1759	1900	1759	1759	1759	1900			
Adj Flow Rate, veh/h	102	370	11	202	196	11			
Adj No. of Lanes	1	0	1	1	0	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	8	8	8	8	0	0			
Cap, veh/h	164	596	502	865	327	18			
Arrive On Green	0.49	0.49	0.49	0.49	0.21	0.21			
Sat Flow, veh/h	334	1211	867	1759	1569	88			
Grp Volume(v), veh/h	0	472	11	202	208	0			
Grp Sat Flow(s),veh/h/ln	0	1545	867	1759	1665	0			
Q Serve(g_s), s	0.0	6.0	0.3	1.8	3.0	0.0			
Cycle Q Clear(g_c), s	0.0	6.0	6.2	1.8	3.0	0.0			
Prop In Lane		0.78	1.00		0.94	0.05			
Lane Grp Cap(c), veh/h	0	760	502	865	347	0			
V/C Ratio(X)	0.00	0.62	0.02	0.23	0.60	0.00			
Avail Cap(c_a), veh/h	0	1738	1051	1979	1374	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	0.0	5.0	7.2	3.9	9.6	0.0			
Incr Delay (d2), s/veh	0.0	0.8	0.0	0.1	1.7	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.7	0.1	0.9	1.5	0.0			
LnGrp Delay(d),s/veh	0.0	5.8	7.2	4.0	11.2	0.0			
LnGrp LOS		A	A	A	B				
Approach Vol, veh/h	472			213	208				
Approach Delay, s/veh	5.8			4.2	11.2				
Approach LOS	A			A	B				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs		2		4				8	
Phs Duration (G+Y+Rc), s		9.6		17.1				17.1	
Change Period (Y+Rc), s		4.0		4.0				4.0	
Max Green Setting (Gmax), s		22.0		30.0				30.0	
Max Q Clear Time (g_c+I1), s		5.0		8.0				8.2	
Green Ext Time (p_c), s		0.5		5.0				5.0	
Intersection Summary									
HCM 2010 Ctrl Delay			6.7						
HCM 2010 LOS			A						
Notes									
User approved volume balancing among the lanes for turning movement.									

Queues
3: Los Coches Drive & Metz Road













Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	561	11	167	562
v/c Ratio	0.78	0.07	0.24	0.78
Control Delay	19.8	11.7	11.8	22.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.8	11.7	11.8	22.1
Queue Length 50th (ft)	105	2	32	135
Queue Length 95th (ft)	#259	11	73	#292
Internal Link Dist (ft)	384		892	566
Turn Bay Length (ft)		50		
Base Capacity (vph)	1008	246	1032	1010
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	0.56	0.04	0.16	0.56









Intersection Summary

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






















HCM 2010 Signalized Intersection Summary
3: Los Coches Drive & Metz Road

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Traffic Volume (veh/h)	229	287	10	154	507	10		
Future Volume (veh/h)	229	287	10	154	507	10		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1900	1759	1759	1759	1900		
Adj Flow Rate, veh/h	249	312	11	167	551	11		
Adj No. of Lanes	1	0	1	1	0	0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	8	8	8	8	0	0		
Cap, veh/h	309	387	262	765	637	13		
Arrive On Green	0.43	0.43	0.43	0.43	0.39	0.39		
Sat Flow, veh/h	711	891	798	1759	1636	33		
Grp Volume(v), veh/h	0	561	11	167	563	0		
Grp Sat Flow(s),veh/h/ln	0	1602	798	1759	1672	0		
Q Serve(g_s), s	0.0	13.8	0.6	2.7	14.1	0.0		
Cycle Q Clear(g_c), s	0.0	13.8	14.4	2.7	14.1	0.0		
Prop In Lane		0.56	1.00		0.98	0.02		
Lane Grp Cap(c), veh/h	0	696	262	765	651	0		
V/C Ratio(X)	0.00	0.81	0.04	0.22	0.87	0.00		
Avail Cap(c_a), veh/h	0	882	355	968	994	0		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	0.0	11.2	17.4	8.0	12.8	0.0		
Incr Delay (d2), s/veh	0.0	4.4	0.1	0.1	5.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.0	6.9	0.1	1.3	7.4	0.0		
LnGrp Delay(d),s/veh	0.0	15.6	17.5	8.2	18.0	0.0		
LnGrp LOS		B	B	A	B			
Approach Vol, veh/h	561			178	563			
Approach Delay, s/veh	15.6			8.7	18.0			
Approach LOS	B			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		21.7		23.7				23.7
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		27.0		25.0				25.0
Max Q Clear Time (g_c+I1), s		16.1		15.8				16.4
Green Ext Time (p_c), s		1.6		3.5				3.4
Intersection Summary								
HCM 2010 Ctrl Delay			15.7					
HCM 2010 LOS			B					
Notes								
User approved volume balancing among the lanes for turning movement.								









Queues
3: Los Coches Drive & Metz Road

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	472	11	207	196	66	5	110
v/c Ratio	0.01	0.69	0.06	0.35	0.28	0.13	0.03	0.28
Control Delay	10.6	12.0	11.7	13.2	17.9	11.1	23.4	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	12.0	11.7	13.2	17.9	11.1	23.4	18.9
Queue Length 50th (ft)	1	40	2	36	20	11	1	21
Queue Length 95th (ft)	6	135	11	89	56	36	11	71
Internal Link Dist (ft)		384		892		566		293
Turn Bay Length (ft)	50		50		300		50	
Base Capacity (vph)	1125	1502	494	1688	1608	1530	195	1105
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	0.00	0.31	0.02	0.12	0.12	0.04	0.03	0.10
Intersection Summary								

HCM 2010 Signalized Intersection Summary
 3: Los Coches Drive & Metz Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	94	340	10	186	5	180	51	10	5	97	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1759	1900	1759	1762	1900	1759	1845	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	102	370	11	202	5	196	55	11	5	105	5
Adj No. of Lanes	1	1	0	1	1	0	2	1	0	1	1	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
Percent Heavy Veh, %	2	8	8	8	8	8	8	2	2	2	2	2
Cap, veh/h	610	144	522	351	737	18	381	357	71	10	225	11
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.12	0.24	0.24	0.01	0.13	0.13
Sat Flow, veh/h	1170	334	1211	867	1712	42	3250	1493	299	1774	1764	84
Grp Volume(v), veh/h	5	0	472	11	0	207	196	0	66	5	0	110
Grp Sat Flow(s),veh/h/ln	1170	0	1545	867	0	1754	1625	0	1792	1774	0	1848
Q Serve(g_s), s	0.1	0.0	9.3	0.4	0.0	2.8	2.1	0.0	1.1	0.1	0.0	2.0
Cycle Q Clear(g_c), s	2.9	0.0	9.3	9.6	0.0	2.8	2.1	0.0	1.1	0.1	0.0	2.0
Prop In Lane	1.00		0.78	1.00		0.02	1.00		0.17	1.00		0.05
Lane Grp Cap(c), veh/h	610	0	666	351	0	756	381	0	429	10	0	236
V/C Ratio(X)	0.01	0.00	0.71	0.03	0.00	0.27	0.51	0.00	0.15	0.52	0.00	0.47
Avail Cap(c_a), veh/h	1625	0	2007	1103	0	2277	1583	0	1745	192	0	1100
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.7	0.0	8.6	12.6	0.0	6.8	15.3	0.0	11.1	18.3	0.0	15.0
Incr Delay (d2), s/veh	0.0	0.0	1.4	0.0	0.0	0.2	1.1	0.0	0.2	37.4	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.1	0.1	0.0	1.4	1.0	0.0	0.6	0.1	0.0	1.1
LnGrp Delay(d),s/veh	7.7	0.0	10.0	12.6	0.0	7.0	16.4	0.0	11.3	55.8	0.0	16.4
LnGrp LOS	A		B	B		A	B		B	E		B
Approach Vol, veh/h		477			218			262				115
Approach Delay, s/veh		10.0			7.3			15.1				18.1
Approach LOS		B			A			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.2	12.8		19.9	8.3	8.7		19.9				
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0				
Max Green Setting (Gmax), s	4.0	36.0		48.0	18.0	22.0		48.0				
Max Q Clear Time (g_c+I1), s	2.1	3.1		11.3	4.1	4.0		11.6				
Green Ext Time (p_c), s	0.0	0.8		4.3	0.5	0.7		4.3				
Intersection Summary												
HCM 2010 Ctrl Delay			11.6									
HCM 2010 LOS			B									

Queues
3: Los Coches Drive & Metz Road

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	561	11	172	551	168	5	142
v/c Ratio	0.01	0.81	0.07	0.25	0.67	0.23	0.05	0.47
Control Delay	14.0	26.4	15.8	15.5	30.3	15.3	42.4	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	26.4	15.8	15.5	30.3	15.3	42.4	36.4
Queue Length 50th (ft)	1	168	3	45	105	37	2	53
Queue Length 95th (ft)	8	373	15	106	222	119	15	142
Internal Link Dist (ft)		384		892		566		293
Turn Bay Length (ft)	50		50		300		50	
Base Capacity (vph)	841	1160	269	1236	1256	1087	109	489
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	0.01	0.48	0.04	0.14	0.44	0.15	0.05	0.29
Intersection Summary								

HCM 2010 Signalized Intersection Summary
3: Los Coches Drive & Metz Road

TAMC Regional ICE - Soledad
Proposed Alternative PM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	229	287	10	154	5	507	144	10	5	126	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1759	1900	1759	1762	1900	1759	1856	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	249	312	11	167	5	551	157	11	5	137	5
Adj No. of Lanes	1	1	0	1	1	0	2	1	0	1	1	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
Percent Heavy Veh, %	2	8	8	8	8	8	8	2	2	2	2	2
Cap, veh/h	579	309	387	232	739	22	728	593	42	9	227	8
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.22	0.35	0.35	0.01	0.13	0.13
Sat Flow, veh/h	1208	711	891	798	1702	51	3250	1714	120	1774	1786	65
Grp Volume(v), veh/h	5	0	561	11	0	172	551	0	168	5	0	142
Grp Sat Flow(s),veh/h/ln	1208	0	1602	798	0	1753	1625	0	1834	1774	0	1851
Q Serve(g_s), s	0.1	0.0	17.0	0.7	0.0	3.4	8.9	0.0	3.7	0.2	0.0	4.1
Cycle Q Clear(g_c), s	3.6	0.0	17.0	17.7	0.0	3.4	8.9	0.0	3.7	0.2	0.0	4.1
Prop In Lane	1.00		0.56	1.00		0.03	1.00		0.07	1.00		0.04
Lane Grp Cap(c), veh/h	579	0	695	232	0	761	728	0	634	9	0	235
V/C Ratio(X)	0.01	0.00	0.81	0.05	0.00	0.23	0.76	0.00	0.26	0.53	0.00	0.60
Avail Cap(c_a), veh/h	1049	0	1319	543	0	1443	1454	0	1247	127	0	563
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.0	0.0	13.8	21.5	0.0	9.9	20.3	0.0	13.2	27.7	0.0	23.1
Incr Delay (d2), s/veh	0.0	0.0	2.3	0.1	0.0	0.1	1.6	0.0	0.2	38.7	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.9	0.2	0.0	1.7	4.1	0.0	1.9	0.2	0.0	2.2
LnGrp Delay(d),s/veh	11.1	0.0	16.0	21.6	0.0	10.1	21.9	0.0	13.4	66.4	0.0	25.5
LnGrp LOS	B		B	C		B	C		B	E		C
Approach Vol, veh/h		566			183			719				147
Approach Delay, s/veh		16.0			10.8			19.9				26.9
Approach LOS		B			B			B				C
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.3	23.3		28.3	16.5	11.1		28.3				
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0				
Max Green Setting (Gmax), s	4.0	38.0		46.0	25.0	17.0		46.0				
Max Q Clear Time (g_c+I1), s	2.2	5.7		19.0	10.9	6.1		19.7				
Green Ext Time (p_c), s	0.0	1.5		4.6	1.7	1.1		4.5				
Intersection Summary												
HCM 2010 Ctrl Delay			18.1									
HCM 2010 LOS			B									

METZ ROAD AT PINNACLES PARKWAY (PROPOSED)

Sidra Outputs

LANE SUMMARY

 Site: 2015 Proposed AM - Final

SOL01
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Los Coches Drive													
Lane 1 ^d	15	8.0	1264	0.012	100	2.9	LOS A	0.1	1.3	Full	1600	0.0	0.0
Approach	15	8.0		0.012		2.9	LOS A	0.1	1.3				
East: Metz Road													
Lane 1 ^d	76	8.0	1392	0.055	100	3.0	LOS A	0.2	6.4	Full	1600	0.0	0.0
Approach	76	8.0		0.055		3.0	LOS A	0.2	6.4				
West: Metz Street													
Lane 1 ^d	117	8.0	1398	0.084	100	3.2	LOS A	0.4	10.2	Full	1600	0.0	0.0
Approach	117	8.0		0.084		3.2	LOS A	0.4	10.2				
Intersection	209	8.0		0.084		3.1	LOS A	0.4	10.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Wednesday, August 19, 2015 9:07:52 AM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\SOL_01_Los Coches Drive at Metz St

\SOL01.sip6

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2015 Proposed PM- Final

SOL01
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Los Coches Drive													
Lane 1 ^d	34	8.0	1232	0.027	100	3.1	LOS A	0.1	3.1	Full	1600	0.0	0.0
Approach	34	8.0		0.027		3.1	LOS A	0.1	3.1				
East: Metz Road													
Lane 1 ^d	148	8.0	1366	0.108	100	3.5	LOS A	0.5	13.4	Full	1600	0.0	0.0
Approach	148	8.0		0.108		3.5	LOS A	0.5	13.4				
West: Metz Street													
Lane 1 ^d	157	8.0	1398	0.112	100	3.5	LOS A	0.5	14.0	Full	1600	0.0	0.0
Approach	157	8.0		0.112		3.5	LOS A	0.5	14.0				
Intersection	338	8.0		0.112		3.4	LOS A	0.5	14.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Tuesday, August 11, 2015 3:22:57 PM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\SOL_01_Los Coches Drive at Metz St

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SIDRA
INTERSECTION 6

LANE SUMMARY

 Site: 2035 Proposed AM - Final

SOL01
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Los Coches Drive													
Lane 1 ^d	207	8.0	1267	0.163	100	4.2	LOS A	0.8	20.9	Full	1600	0.0	0.0
Approach	207	8.0		0.163		4.2	LOS A	0.8	20.9				
East: Metz Road													
Lane 1 ^d	213	8.0	1151	0.185	100	4.8	LOS A	0.9	23.5	Full	1600	0.0	0.0
Approach	213	8.0		0.185		4.8	LOS A	0.9	23.5				
West: Metz Street													
Lane 1 ^d	472	8.0	1391	0.339	100	5.6	LOS A	2.1	56.2	Full	1600	0.0	0.0
Approach	472	8.0		0.339		5.6	LOS A	2.1	56.2				
Intersection	891	8.0		0.339		5.1	LOS A	2.1	56.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

Processed: Wednesday, August 19, 2015 9:07:29 AM

SIDRA INTERSECTION 6.0.24.4877

Project: C:\Users\ndorman\Desktop\Active Projects\TAMC\Intersections\SOL_01_Los Coches Drive at Metz St

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**SIDRA
INTERSECTION 6**

LANE SUMMARY

 Site: 2035 Proposed PM - Final

SOL01
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Los Coches Drive													
Lane 1 ^d	562	8.0	1090	0.516	100	9.3	LOS A	3.4	90.6	Full	1600	0.0	0.0
Approach	562	8.0		0.516		9.3	LOS A	3.4	90.6				
East: Metz Road													
Lane 1 ^d	178	8.0	800	0.223	100	6.9	LOS A	1.0	25.9	Full	1600	0.0	0.0
Approach	178	8.0		0.223		6.9	LOS A	1.0	25.9				
West: Metz Street													
Lane 1 ^d	561	8.0	1391	0.403	100	6.3	LOS A	2.8	73.6	Full	1600	0.0	0.0
Approach	561	8.0		0.403		6.3	LOS A	2.8	73.6				
Intersection	1301	8.0		0.516		7.7	LOS A	3.4	90.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2035 Proposed ALT (4-Leg) AM - Final

SOL01
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Los Coches Drive													
Lane 1 ^d	262	8.0	1237	0.212	100	4.7	LOS A	1.1	28.0	Full	1600	0.0	0.0
Approach	262	8.0		0.212		4.7	LOS A	1.1	28.0				
East: Metz Road													
Lane 1 ^d	218	8.0	1076	0.203	100	5.2	LOS A	1.0	25.6	Full	1600	0.0	0.0
Approach	218	8.0		0.203		5.2	LOS A	1.0	25.6				
North: Gabilan Dr													
Lane 1 ^d	116	8.0	877	0.133	100	5.4	LOS A	0.5	14.3	Full	1600	0.0	0.0
Approach	116	8.0		0.133		5.4	LOS A	0.5	14.3				
West: Metz Street													
Lane 1 ^d	477	8.0	1233	0.387	100	6.7	LOS A	2.4	63.2	Full	1600	0.0	0.0
Approach	477	8.0		0.387		6.7	LOS A	2.4	63.2				
Intersection	1074	8.0		0.387		5.8	LOS A	2.4	63.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2035 Proposed ALT (4-Leg) PM - Final

SOL01
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: Los Coches Drive													
Lane 1 ^d	718	8.0	1064	0.675	100	13.5	LOS B	6.5	172.4	Full	1600	0.0	0.0
Approach	718	8.0		0.675		13.5	LOS B	6.5	172.4				
East: Metz Road													
Lane 1 ^d	184	8.0	670	0.274	100	8.8	LOS A	1.2	31.1	Full	1600	0.0	0.0
Approach	184	8.0		0.274		8.8	LOS A	1.2	31.1				
North: Gabilan Dr													
Lane 1 ^d	148	8.0	632	0.234	100	8.6	LOS A	0.9	24.5	Full	1600	0.0	0.0
Approach	148	8.0		0.234		8.6	LOS A	0.9	24.5				
West: Metz Street													
Lane 1 ^d	566	8.0	1192	0.475	100	8.1	LOS A	3.2	85.1	Full	1600	0.0	0.0
Approach	566	8.0		0.475		8.1	LOS A	3.2	85.1				
Intersection	1616	8.0		0.675		10.6	LOS B	6.5	172.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

FRONT STREET AT EAST STREET

Capital Cost Worksheet

City of Soledad **Capital Cost Worksheet**

SOL_02	Front Street at East Street						
	Capital Cost			Project Constants			
	SIGNAL	ROUNDAABOUT	Added Cost for Roundabout	Added O&M Cost for Roundabout	Total Benefits	Total Costs	B/C
B/C Target	(a)	(b)	(c) = (b - a)	(d)	(e)	(f) = (c + d)	(g) = (e / f)
Actual	\$ 949,600	\$ 1,337,525	\$ 387,925	\$ (50,352)	\$ 669,649	\$ 337,573	1.98
High	\$ 1,044,560	\$ 1,203,773	\$ 159,213			\$ 108,861	6.15
Low	\$ 854,640	\$ 1,471,278	\$ 616,638			\$ 566,286	1.18
Breakeven	\$ 949,600	\$ 1,669,601	\$ 720,001			\$ 669,649	1.00
Custom 1							
Custom 2							

Capital Cost Relationship (B/C=1.00)

SIGNAL	ROUNDAABOUT
\$ -	\$ 600,000
\$ -	\$ 800,000
\$ -	\$ 1,000,000
\$ 479,999	\$ 1,200,000
\$ 679,999	\$ 1,400,000
\$ 879,999	\$ 1,600,000
\$ 1,079,999	\$ 1,800,000
\$ 1,279,999	\$ 2,000,000
\$ 1,479,999	\$ 2,200,000
\$ 1,679,999	\$ 2,400,000

Cost Sensitivity Assumptions

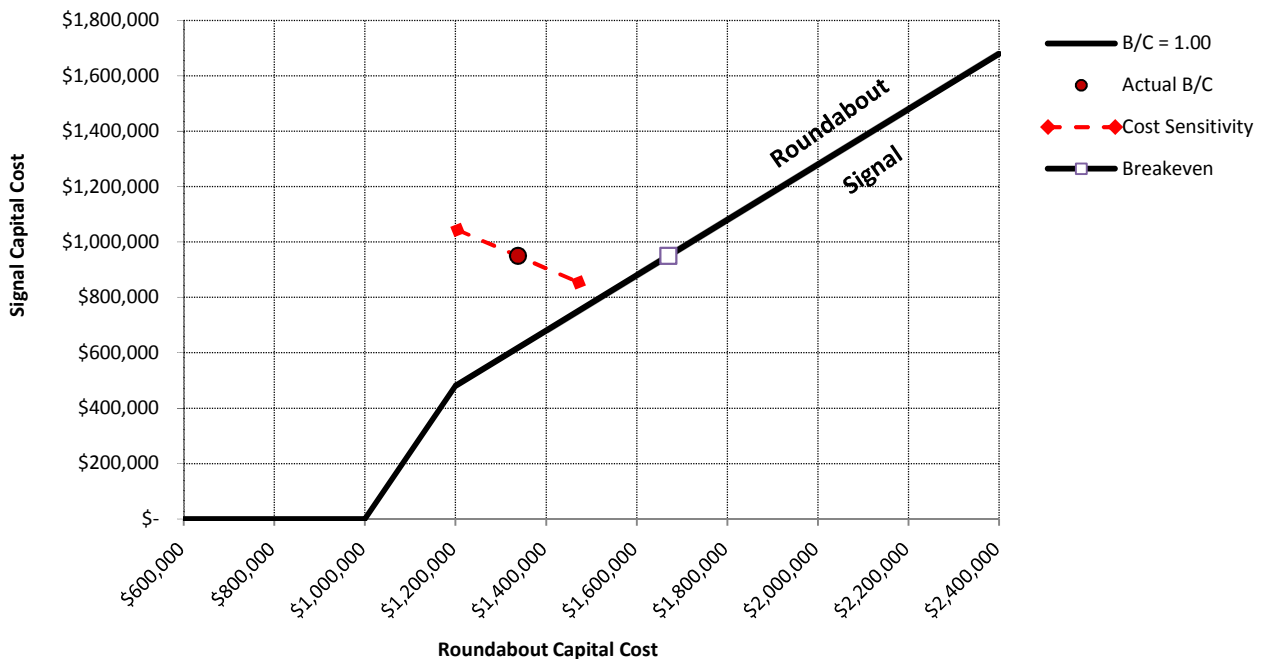
B/C Target	Percent Adjustment to Cost	
	Signal	Roundabout
High	10%	-10%
Low	-10%	10%
Breakeven	0%	25%
Custom 1		
Custom 2		

Chart Assumptions

Cost Increase	\$ 200,000	(x axis major unit)
Min Signal Cost	\$ 400,000	(Min. cost to construct a signal)

NOTE: Breakeven is the capital cost budget for a roundabout based on the actual capital cost of the signal alternative and a B/C = 1.00

RELATIONSHIP BETWEEN INITIAL CAPITAL COSTS



FRONT STREET AT EAST STREET

Turning Movement Volumes

EXISTING												
PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
EXISTING												
Vehicles	4	2	10	5	360	151	153	2	22	43	288	7
PHF	0.65	0.65	0.65	0.88	0.88	0.88	0.75	0.75	0.75	0.84	0.84	0.84
Truck %	2%	2%	2%	5%	5%	5%	15%	15%	15%	2%	2%	2%
Pedestrians	8	0	0	6	0	6	0	0	8	6	0	6
Bicycles	0	0	3	0	0	0	0	0	0	0	0	0
<i>Source: Soledad Business Park TIA (2013), 2015</i>												

CUMULATIVE												
AM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	5	0	3	10	118	104	257	2	22	41	228	3
PHF	0.65	0.65	0.65	0.88	0.88	0.88	0.75	0.75	0.75	0.84	0.84	0.84
Truck %	2%	2%	2%	5%	5%	5%	15%	15%	15%	2%	2%	2%
Pedestrians	8	0	0	6	0	6	0	0	8	6	0	6
Bicycles												

PM	NB			WB			SB			EB		
	↶	↑	↷	↶	↑	↷	↶	↑	↷	↶	↑	↷
CUMULATIVE												
Vehicles	5	2	13	6	434	261	206	2	20	56	262	9
PHF	0.65	0.65	0.65	0.88	0.88	0.88	0.75	0.75	0.75	0.84	0.84	0.84
Truck %	2%	2%	2%	5%	5%	5%	15%	15%	15%	2%	2%	2%
Pedestrians	8		0	6		6	0		8	6		6
Bicycles												
<i>Source: Soledad Business Park TIA (2013), 2035</i>												

FRONT STREET AT EAST STREET

Synchro Outputs

Intersection												
Intersection Delay, s/veh	32.7											
Intersection LOS	D											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	43	288	7	0	5	360	151	0	4	2	10
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.88	0.88	0.88	0.92	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	5	5	5	2	2	2	2
Mvmt Flow	0	51	343	8	0	6	409	172	0	6	3	15
Number of Lanes	0	0	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	20.3	48.9	10.7
HCM LOS	C	E	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	25%	13%	100%	0%	86%
Vol Thru, %	12%	85%	0%	70%	1%
Vol Right, %	62%	2%	0%	30%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	16	338	5	511	177
LT Vol	4	43	5	0	153
Through Vol	2	288	0	360	2
RT Vol	10	7	0	151	22
Lane Flow Rate	25	402	6	581	236
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.05	0.666	0.01	0.95	0.465
Departure Headway (Hd)	7.31	6.071	6.61	5.892	7.089
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	492	600	537	610	512
Service Time	5.325	4.071	4.408	3.689	5.092
HCM Lane V/C Ratio	0.051	0.67	0.011	0.952	0.461
HCM Control Delay	10.7	20.3	9.5	49.3	16.1
HCM Lane LOS	B	C	A	E	C
HCM 95th-tile Q	0.2	5	0	12.9	2.4

Intersection

Intersection Delay, s/veh
Intersection LOS










Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	153	2	22
Peak Hour Factor	0.92	0.75	0.75	0.75
Heavy Vehicles, %	2	15	15	15
Mvmt Flow	0	204	3	29
Number of Lanes	0	0	1	0

Approach






















	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	16.1
HCM LOS	C

Lane

Queues
7: Front St & East St

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	51	351	6	409	172	6	18	204	32
v/c Ratio	0.17	0.44	0.02	0.53	0.23	0.01	0.02	0.36	0.05
Control Delay	14.1	16.2	11.8	17.9	3.2	10.5	6.2	14.7	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	16.2	11.8	17.9	3.2	10.5	6.2	14.7	5.0
Queue Length 50th (ft)	13	102	1	125	0	1	1	54	1
Queue Length 95th (ft)	32	152	8	197	30	5	7	80	10
Internal Link Dist (ft)		350		548			51		1377
Turn Bay Length (ft)	50		50		200	50		200	
Base Capacity (vph)	307	796	343	775	738	618	739	563	647
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.44	0.02	0.53	0.23	0.01	0.02	0.36	0.05
Intersection Summary									

HCM 2010 Signalized Intersection Summary
7: Front St & East St

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	288	7	5	360	151	4	2	10	153	2	22
Future Volume (veh/h)	43	288	7	5	360	151	4	2	10	153	2	22
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.97	0.99		0.99
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1810	1810	1810	1863	1863	1900	1652	1652	1900
Adj Flow Rate, veh/h	51	343	8	6	409	172	6	3	15	204	3	29
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.84	0.84	0.84	0.88	0.88	0.88	0.65	0.65	0.65	0.75	0.75	0.75
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	15	15	15
Cap, veh/h	320	777	18	396	776	655	708	120	602	654	61	585
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	828	1813	42	994	1810	1527	1361	263	1317	1222	132	1280
Grp Volume(v), veh/h	51	0	351	6	409	172	6	0	18	204	0	32
Grp Sat Flow(s),veh/h/ln	828	0	1855	994	1810	1527	1361	0	1581	1222	0	1413
Q Serve(g_s), s	3.4	0.0	9.3	0.3	11.7	5.1	0.2	0.0	0.4	7.7	0.0	0.9
Cycle Q Clear(g_c), s	15.1	0.0	9.3	9.6	11.7	5.1	1.1	0.0	0.4	8.1	0.0	0.9
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.83	1.00		0.91
Lane Grp Cap(c), veh/h	320	0	795	396	776	655	708	0	723	654	0	646
V/C Ratio(X)	0.16	0.00	0.44	0.02	0.53	0.26	0.01	0.00	0.02	0.31	0.00	0.05
Avail Cap(c_a), veh/h	320	0	795	396	776	655	708	0	723	654	0	646
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	14.1	17.5	14.8	12.9	10.8	0.0	10.4	12.7	0.0	10.6
Incr Delay (d2), s/veh	1.1	0.0	1.8	0.1	2.6	1.0	0.0	0.0	0.0	1.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	5.2	0.1	6.3	2.3	0.1	0.0	0.2	2.8	0.0	0.4
LnGrp Delay(d),s/veh	21.4	0.0	15.9	17.6	17.3	13.9	10.9	0.0	10.4	13.9	0.0	10.7
LnGrp LOS	C		B	B	B	B	B		B	B		B
Approach Vol, veh/h		402			587			24				236
Approach Delay, s/veh		16.6			16.3			10.5				13.5
Approach LOS		B			B			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		34.0		36.0		34.0		36.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		30.0		32.0		30.0		32.0				
Max Q Clear Time (g_c+I1), s		13.7		3.1		17.1		10.1				
Green Ext Time (p_c), s		5.1		1.1		4.6		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay				15.7								
HCM 2010 LOS				B								

Intersection												
Intersection Delay, s/veh	15.6											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	41	228	3	0	10	118	104	0	5	0	3
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.88	0.88	0.88	0.92	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	5	5	5	2	2	2	2
Mvmt Flow	0	49	271	4	0	11	134	118	0	8	0	5
Number of Lanes	0	0	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	14.9	12.9	9.6
HCM LOS	B	B	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	62%	15%	100%	0%	91%
Vol Thru, %	0%	84%	0%	53%	1%
Vol Right, %	38%	1%	0%	47%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	272	10	222	281
LT Vol	5	41	10	0	257
Through Vol	0	228	0	118	2
RT Vol	3	3	0	104	22
Lane Flow Rate	12	324	11	252	375
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.022	0.517	0.022	0.419	0.621
Departure Headway (Hd)	6.351	5.749	6.818	5.975	5.971
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	559	625	524	600	603
Service Time	4.441	3.805	4.578	3.735	4.021
HCM Lane V/C Ratio	0.021	0.518	0.021	0.42	0.622
HCM Control Delay	9.6	14.9	9.7	13	18.4
HCM Lane LOS	A	B	A	B	C
HCM 95th-tile Q	0.1	3	0.1	2.1	4.3

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	257	2	22
Peak Hour Factor	0.92	0.75	0.75	0.75
Heavy Vehicles, %	2	15	15	15
Mvmt Flow	0	343	3	29
Number of Lanes	0	0	1	0

Approach SB

Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	18.4
HCM LOS	C

Lane

Intersection												
Intersection Delay, s/veh	42.4											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	56	262	9	0	6	434	261	0	5	2	13
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.88	0.88	0.88	0.92	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	5	5	5	2	2	2	2
Mvmt Flow	0	67	312	11	0	7	493	297	0	8	3	20
Number of Lanes	0	0	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	22.3	61.9	11.1
HCM LOS	C	F	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	25%	17%	100%	0%	90%
Vol Thru, %	10%	80%	0%	62%	1%
Vol Right, %	65%	3%	0%	38%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	327	6	695	228
LT Vol	5	56	6	0	206
Through Vol	2	262	0	434	2
RT Vol	13	9	0	261	20
Lane Flow Rate	31	389	7	790	304
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.065	0.688	0.013	1	0.6
Departure Headway (Hd)	7.553	6.363	7.038	6.26	7.109
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	473	568	508	584	508
Service Time	5.618	4.399	4.793	4.015	5.14
HCM Lane V/C Ratio	0.066	0.685	0.014	1.353	0.598
HCM Control Delay	11.1	22.3	9.9	62.3	20.3
HCM Lane LOS	B	C	A	F	C
HCM 95th-tile Q	0.2	5.3	0	14.6	3.9

Intersection

Intersection Delay, s/veh
Intersection LOS










Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	206	2	20
Peak Hour Factor	0.92	0.75	0.75	0.75
Heavy Vehicles, %	2	15	15	15
Mvmt Flow	0	275	3	27
Number of Lanes	0	0	1	0

Approach

	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	20.3
HCM LOS	C






















Lane

Queues
7: Front St & East St










									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	49	275	11	134	118	8	5	343	32
v/c Ratio	0.09	0.35	0.03	0.17	0.17	0.01	0.01	0.60	0.05
Control Delay	12.6	14.9	11.9	13.1	3.4	10.6	0.0	19.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	14.9	11.9	13.1	3.4	10.6	0.0	19.8	5.0
Queue Length 50th (ft)	12	76	3	34	0	2	0	105	1
Queue Length 95th (ft)	29	119	11	65	25	6	0	141	10
Internal Link Dist (ft)		350		548			51		1377
Turn Bay Length (ft)	50		50		200	50		200	
Base Capacity (vph)	531	796	405	775	707	618	960	569	647
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.35	0.03	0.17	0.17	0.01	0.01	0.60	0.05
Intersection Summary									

HCM 2010 Signalized Intersection Summary
7: Front St & East St






















TAMC Regional ICE - Soledad
Proposed AM (2035)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	228	3	10	118	104	5	0	3	257	2	22
Future Volume (veh/h)	41	228	3	10	118	104	5	0	3	257	2	22
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.97	0.99		0.99
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1810	1810	1810	1863	1863	1900	1652	1652	1900
Adj Flow Rate, veh/h	49	271	4	11	134	118	8	0	5	343	3	29
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.84	0.84	0.84	0.88	0.88	0.88	0.65	0.65	0.65	0.75	0.75	0.75
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	15	15	15
Cap, veh/h	531	785	12	454	776	655	708	0	701	666	61	585
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.46	0.00	0.46	0.46	0.46	0.46
Sat Flow, veh/h	1118	1831	27	1065	1810	1527	1361	0	1534	1236	132	1280
Grp Volume(v), veh/h	49	0	275	11	134	118	8	0	5	343	0	32
Grp Sat Flow(s),veh/h/ln	1118	0	1858	1065	1810	1527	1361	0	1534	1236	0	1413
Q Serve(g_s), s	2.0	0.0	6.9	0.5	3.2	3.3	0.2	0.0	0.1	14.6	0.0	0.9
Cycle Q Clear(g_c), s	5.2	0.0	6.9	7.4	3.2	3.3	1.1	0.0	0.1	14.8	0.0	0.9
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		0.91
Lane Grp Cap(c), veh/h	531	0	796	454	776	655	708	0	701	666	0	646
V/C Ratio(X)	0.09	0.00	0.35	0.02	0.17	0.18	0.01	0.00	0.01	0.52	0.00	0.05
Avail Cap(c_a), veh/h	531	0	796	454	776	655	708	0	701	666	0	646
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	0.0	13.4	15.9	12.3	12.4	10.9	0.0	10.3	14.4	0.0	10.6
Incr Delay (d2), s/veh	0.3	0.0	1.2	0.1	0.5	0.6	0.0	0.0	0.0	2.8	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	3.8	0.2	1.7	1.5	0.1	0.0	0.1	5.5	0.0	0.4
LnGrp Delay(d),s/veh	14.3	0.0	14.6	16.0	12.8	13.0	10.9	0.0	10.4	17.2	0.0	10.7
LnGrp LOS	B		B	B	B	B	B		B	B		B
Approach Vol, veh/h		324			263			13				375
Approach Delay, s/veh		14.6			13.0			10.7				16.7
Approach LOS		B			B			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		34.0		36.0		34.0		36.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		30.0		32.0		30.0		32.0				
Max Q Clear Time (g_c+I1), s		9.4		3.1		8.9		16.8				
Green Ext Time (p_c), s		2.9		1.6		2.9		1.4				
Intersection Summary												
HCM 2010 Ctrl Delay				14.9								
HCM 2010 LOS				B								

Queues
7: Front St & East St

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	323	7	493	297	8	23	275	30
v/c Ratio	0.28	0.41	0.02	0.64	0.37	0.01	0.03	0.49	0.05
Control Delay	16.9	15.7	11.8	20.3	3.2	10.6	5.6	17.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	15.7	11.8	20.3	3.2	10.6	5.6	17.1	5.1
Queue Length 50th (ft)	18	92	2	160	0	2	1	79	1
Queue Length 95th (ft)	43	139	8	248	37	6	7	110	10
Internal Link Dist (ft)		350		548			234		1377
Turn Bay Length (ft)	50		50		200	50		200	
Base Capacity (vph)	242	795	366	775	810	619	737	560	647
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.41	0.02	0.64	0.37	0.01	0.03	0.49	0.05
Intersection Summary									

HCM 2010 Signalized Intersection Summary
7: Front St & East St

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	262	9	6	434	261	5	2	13	206	2	20
Future Volume (veh/h)	56	262	9	6	434	261	5	2	13	206	2	20
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.97	0.99		0.99
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1810	1810	1810	1863	1863	1900	1652	1652	1900
Adj Flow Rate, veh/h	67	312	11	7	493	297	8	3	20	275	3	27
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.84	0.84	0.84	0.88	0.88	0.88	0.65	0.65	0.65	0.75	0.75	0.75
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	15	15	15
Cap, veh/h	249	766	27	417	776	655	710	94	624	649	65	582
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	682	1788	63	1020	1810	1527	1363	205	1366	1216	141	1273
Grp Volume(v), veh/h	67	0	323	7	493	297	8	0	23	275	0	30
Grp Sat Flow(s),veh/h/ln	682	0	1851	1020	1810	1527	1363	0	1570	1216	0	1414
Q Serve(g_s), s	6.0	0.0	8.5	0.3	15.0	9.7	0.2	0.0	0.6	11.3	0.0	0.8
Cycle Q Clear(g_c), s	21.0	0.0	8.5	8.8	15.0	9.7	1.1	0.0	0.6	11.8	0.0	0.8
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.87	1.00		0.90
Lane Grp Cap(c), veh/h	249	0	793	417	776	655	710	0	718	649	0	647
V/C Ratio(X)	0.27	0.00	0.41	0.02	0.64	0.45	0.01	0.00	0.03	0.42	0.00	0.05
Avail Cap(c_a), veh/h	249	0	793	417	776	655	710	0	718	649	0	647
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	13.8	16.9	15.7	14.2	10.8	0.0	10.5	13.7	0.0	10.5
Incr Delay (d2), s/veh	2.6	0.0	1.5	0.1	4.0	2.3	0.0	0.0	0.0	2.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	4.6	0.1	8.2	4.5	0.1	0.0	0.2	4.1	0.0	0.3
LnGrp Delay(d),s/veh	26.6	0.0	15.4	17.0	19.7	16.5	10.8	0.0	10.5	15.8	0.0	10.7
LnGrp LOS	C		B	B	B	B	B		B	B		B
Approach Vol, veh/h		390			797			31				305
Approach Delay, s/veh		17.3			18.4			10.6				15.3
Approach LOS		B			B			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		34.0		36.0		34.0		36.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		30.0		32.0		30.0		32.0				
Max Q Clear Time (g_c+I1), s		17.0		3.1		23.0		13.8				
Green Ext Time (p_c), s		5.5		1.5		3.7		1.3				
Intersection Summary												
HCM 2010 Ctrl Delay				17.4								
HCM 2010 LOS				B								

FRONT STREET AT EAST STREET

Sidra Outputs

LANE SUMMARY

 Site: 2015 Proposed PM - Final

Front St and East St
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: East St													
Lane 1 ^d	25	2.0	768	0.032	100	5.0	LOS A	0.1	3.2	Full	100	0.0	0.0
Approach	25	2.0		0.032		5.0	LOS A	0.1	3.2				
East: Front St													
Lane 1 ^d	586	5.0	1322	0.444	100	7.1	LOS A	3.1	80.8	Full	550	0.0	0.0
Approach	586	5.0		0.444		7.1	LOS A	3.1	80.8				
North: East St													
Lane 1 ^d	236	15.0	869	0.271	100	7.0	LOS A	1.2	33.9	Full	400	0.0	0.0
Approach	236	15.0		0.271		7.0	LOS A	1.2	33.9				
West: Front St													
Lane 1 ^d	402	2.0	1134	0.355	100	6.7	LOS A	2.0	51.3	Full	300	0.0	0.0
Approach	402	2.0		0.355		6.7	LOS A	2.0	51.3				
Intersection	1249	5.9		0.444		6.9	LOS A	3.1	80.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2035 Proposed AM - Final

Front St and East St
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: East St													
Lane 1 ^d	14	2.0	713	0.019	100	5.2	LOS A	0.1	1.9	Full	1600	0.0	0.0
Approach	14	2.0		0.019		5.2	LOS A	0.1	1.9				
East: Front St													
Lane 1 ^d	264	5.0	1325	0.199	100	4.4	LOS A	1.0	26.3	Full	1600	0.0	0.0
Approach	264	5.0		0.199		4.4	LOS A	1.0	26.3				
North: East St													
Lane 1 ^d	375	15.0	1144	0.327	100	6.3	LOS A	1.7	48.3	Full	1600	0.0	0.0
Approach	375	15.0		0.327		6.3	LOS A	1.7	48.3				
West: Front St													
Lane 1 ^d	324	2.0	971	0.333	100	7.2	LOS A	1.7	43.7	Full	1600	0.0	0.0
Approach	324	2.0		0.333		7.2	LOS A	1.7	43.7				
Intersection	976	7.8		0.333		6.1	LOS A	1.7	48.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

LANE SUMMARY

 Site: 2035 Proposed PM - Final

Front St and East St
Roundabout

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist ft				
South: East St													
Lane 1 ^d	31	2.0	723	0.043	100	5.4	LOS A	0.2	4.2	Full	100	0.0	0.0
Approach	31	2.0		0.043		5.4	LOS A	0.2	4.2				
East: Front St													
Lane 1 ^d	797	5.0	1299	0.613	100	10.1	LOS B	5.7	147.7	Full	550	0.0	0.0
Approach	797	5.0		0.613		10.1	LOS B	5.7	147.7				
North: East St													
Lane 1 ^d	304	15.0	795	0.382	100	9.2	LOS A	1.8	50.7	Full	400	0.0	0.0
Approach	304	15.0		0.382		9.2	LOS A	1.8	50.7				
West: Front St													
Lane 1 ^d	389	2.0	1050	0.371	100	7.3	LOS A	2.1	52.3	Full	300	0.0	0.0
Approach	389	2.0		0.371		7.3	LOS A	2.1	52.3				
Intersection	1521	6.2		0.613		9.1	LOS A	5.7	147.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach