

# **APPENDIX B**

## **TRAFFIC**

### **ANALYSIS**



HCM Signalized Intersection Capacity Analysis  
1: Giant Road & Parr Boulevard/Road 20

Existing - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	23	30	3	54	20	35	89	1	10	85	67
Future Volume (vph)	35	23	30	3	54	20	35	89	1	10	85	67
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		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.91		1.00	0.96		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1456	1401		1787	1791		1719	1807			1783	1524
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (perm)	1456	1401		1787	1791		1719	1807			1748	1524
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	37	24	32	3	57	21	37	95	1	11	90	71
RTOR Reduction (vph)	0	29	0	0	17	0	0	0	0	0	0	40
Lane Group Flow (vph)	37	27	0	3	61	0	37	96	0	0	101	31
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	24%	24%	24%	1%	1%	1%	5%	5%	5%	6%	6%	6%
Turn Type	Split	NA		Split	NA		Prot	NA		Perm	NA	Perm
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases										6		6
Actuated Green, G (s)	4.4	4.4		4.2	4.2		2.1	29.2			22.1	22.1
Effective Green, g (s)	4.4	4.4		4.2	4.2		2.1	29.2			22.1	22.1
Actuated g/C Ratio	0.09	0.09		0.08	0.08		0.04	0.57			0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	4.0	4.0		3.0	3.0		2.0	4.0			4.0	4.0
Lane Grp Cap (vph)	126	121		147	148		71	1038			760	663
v/s Ratio Prot	c0.03	0.02		0.00	c0.03		c0.02	0.05				
v/s Ratio Perm											c0.06	0.02
v/c Ratio	0.29	0.22		0.02	0.41		0.52	0.09			0.13	0.05
Uniform Delay, d1	21.7	21.6		21.4	22.1		23.9	4.8			8.6	8.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.8	1.3		0.1	1.8		3.2	0.1			0.1	0.0
Delay (s)	23.5	22.9		21.5	24.0		27.0	4.9			8.7	8.3
Level of Service	C	C		C	C		C	A			A	A
Approach Delay (s)		23.1			23.9			11.1			8.5	
Approach LOS		C			C			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			14.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.21									
Actuated Cycle Length (s)			50.8				Sum of lost time (s)				18.0	
Intersection Capacity Utilization			40.7%				ICU Level of Service				A	
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: Rumrill Blvd. & Broadway Ave.

Existing - AM Peak  
01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	10	224	6	137	130	9	10	238	188	8	255	8
Future Volume (vph)	10	224	6	137	130	9	10	238	188	8	255	8
Ideal Flow (vphp)	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	4.5	4.0	4.0	4.5	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	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	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1854		1752	1824		1719	3438	1533	1719	3438	1522
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1854		1752	1824		1719	3438	1533	1719	3438	1522
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)	11	243	7	149	141	10	11	259	204	9	277	9
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	82	0	0	6
Lane Group Flow (vph)	11	248	0	149	149	0	11	259	122	9	277	3
Confl. Peds. (#/hr)	5		9	9		5	3		1	1		3
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	5%	5%	5%	5%	5%	5%
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	8	8		4	4		1	6	4	5	2	8
Permitted Phases									6			2
Actuated Green, G (s)	18.5	18.5		40.2	40.2		1.3	13.6	53.8	1.2	13.5	32.0
Effective Green, g (s)	18.5	18.5		40.2	40.2		1.3	13.6	53.8	1.2	13.5	32.0
Actuated g/C Ratio	0.21	0.21		0.45	0.45		0.01	0.15	0.60	0.01	0.15	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5	4.0	4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	4.0	2.0	2.0	4.0	2.0
Lane Grp Cap (vph)	363	381		782	814		24	519	916	22	515	541
v/s Ratio Prot	0.01	c0.13		c0.09	0.08		c0.01	0.08	0.06	0.01	c0.08	0.00
v/s Ratio Perm									0.02			0.00
v/c Ratio	0.03	0.65		0.19	0.18		0.46	0.50	0.13	0.41	0.54	0.01
Uniform Delay, d1	28.6	32.8		15.1	15.0		44.0	35.1	7.9	44.0	35.4	18.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	3.0		0.5	0.5		5.0	1.0	0.1	4.5	1.4	0.0
Delay (s)	28.6	35.8		15.6	15.5		49.0	36.1	8.0	48.5	36.7	18.7
Level of Service	C	D		B	B		D	D	A	D	D	B
Approach Delay (s)		35.5			15.5			24.3			36.6	
Approach LOS		D			B			C			D	

Intersection Summary

HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
3: San Pablo Ave. & Broadway Ave./El Portal Dr.

Existing - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	530	110	78	285	79	140	352	104	206	673	18
Future Volume (vph)	21	530	110	78	285	79	140	352	104	206	673	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1757	3436		1770	3539	1545	1770	3539	1561	1770	3539	1545
Flt Permitted	0.51	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	938	3436		1770	3539	1545	1770	3539	1561	1770	3539	1545
Peak-hour factor, PHF	0.81	0.81	0.81	0.68	0.68	0.68	0.91	0.91	0.91	0.79	0.79	0.79
Adj. Flow (vph)	26	654	136	115	419	116	154	387	114	261	852	23
RTOR Reduction (vph)	0	18	0	0	0	70	0	0	43	0	0	15
Lane Group Flow (vph)	26	772	0	115	419	46	154	387	71	261	852	8
Confl. Peds. (#/hr)	9		8	8		9	11		5	5		11
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases		4		3	8		5	2	3	1	6	
Permitted Phases	4					8			2			6
Actuated Green, G (s)	26.6	26.6		9.2	40.3	40.3	12.7	30.5	39.7	16.7	34.5	34.5
Effective Green, g (s)	26.6	26.6		9.2	40.3	40.3	12.7	30.5	39.7	16.7	34.5	34.5
Actuated g/C Ratio	0.26	0.26		0.09	0.40	0.40	0.12	0.30	0.39	0.16	0.34	0.34
Clearance Time (s)	4.0	4.0		4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	6.0
Vehicle Extension (s)	2.5	2.5		2.0	2.5	2.5	2.0	6.0	2.0	2.0	6.0	6.0
Lane Grp Cap (vph)	244	896		159	1398	610	220	1058	607	289	1197	522
v/s Ratio Prot		c0.22		c0.06	0.12		0.09	0.11	0.01	c0.15	c0.24	
v/s Ratio Perm	0.03					0.03			0.03			0.01
v/c Ratio	0.11	0.86		0.72	0.30	0.08	0.70	0.37	0.12	0.90	0.71	0.01
Uniform Delay, d1	28.7	35.9		45.2	21.2	19.2	42.8	28.1	19.9	41.9	29.4	22.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.25	1.45	0.96	1.49	0.67	1.00
Incremental Delay, d2	0.1	8.5		12.9	0.1	0.0	7.2	0.9	0.0	26.3	3.2	0.0
Delay (s)	28.8	44.4		58.0	21.3	19.3	60.8	41.6	19.2	88.6	22.8	22.5
Level of Service	C	D		E	C	B	E	D	B	F	C	C
Approach Delay (s)		43.9			27.4			42.2			37.9	
Approach LOS		D			C			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			38.2									D
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			102.0								19.0	
Intersection Capacity Utilization			71.9%									C
Analysis Period (min)			15									
c	Critical Lane Group											

# HCM Unsignalized Intersection Capacity Analysis

Existing - AM Peak

## 4: Mission Bell Dr & El Portal Dr.

01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	291	71	29	230	23	0	0	43	42	15	17
Future Volume (Veh/h)	24	291	71	29	230	23	0	0	43	42	15	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	300	73	30	237	24	0	0	44	43	15	18
Pedestrians		2			2			5			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		264										
pX, platoon unblocked												
vC, conflicting volume	262			378			598	714	194	512	738	134
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262			378			598	714	194	512	738	134
tC, single (s)	4.2			4.2			7.5	6.5	6.9	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			97			100	100	95	89	95	98
cM capacity (veh/h)	1277			1158			352	342	817	386	311	861
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2				
Volume Total	175	223	30	158	103	44	43	33				
Volume Left	25	0	30	0	0	0	43	0				
Volume Right	0	73	0	0	24	44	0	18				
cSH	1277	1700	1158	1700	1700	817	386	477				
Volume to Capacity	0.02	0.13	0.03	0.09	0.06	0.05	0.11	0.07				
Queue Length 95th (ft)	1	0	2	0	0	4	9	6				
Control Delay (s)	1.3	0.0	8.2	0.0	0.0	9.7	15.5	13.1				
Lane LOS	A		A			A	C	B				
Approach Delay (s)	0.6		0.8			9.7	14.5					
Approach LOS						A	B					
<b>Intersection Summary</b>												
Average Delay			2.5									
Intersection Capacity Utilization			32.7%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
5: San Pablo Ave. & 23rd St./Road 20

Existing - AM Peak  
01/05/2022



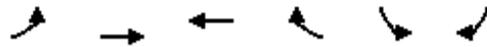
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘		↖	↗	↘	↕		↖	↗	↘
Traffic Volume (vph)	195	52	59	21	56	25	58	167	16	23	281	251
Future Volume (vph)	195	52	59	21	56	25	58	167	16	23	281	251
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1720	1551		1820	1568	1719	3381		1736	3471	1527
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1720	1551		1820	1568	1719	3381		1736	3471	1527
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	203	54	61	22	58	26	60	174	17	24	293	261
RTOR Reduction (vph)	0	0	39	0	0	23	0	3	0	0	0	128
Lane Group Flow (vph)	128	129	22	0	80	3	60	188	0	24	293	133
Confl. Peds. (#/hr)			5	5			9		7	7		9
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	5%	5%	5%	4%	4%	4%
Turn Type	Split	NA	pm+ov	Split	NA	Perm	Prot	NA		Prot	NA	pm+ov
Protected Phases	4	4	5	8	8		5	2		1	6	4
Permitted Phases			4			8						6
Actuated Green, G (s)	22.2	22.2	30.0		10.0	10.0	7.8	26.4		2.5	21.1	43.3
Effective Green, g (s)	22.2	22.2	30.0		10.0	10.0	7.8	26.4		2.5	21.1	43.3
Actuated g/C Ratio	0.26	0.26	0.35		0.12	0.12	0.09	0.31		0.03	0.25	0.51
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	6.0		2.0	6.0	2.0
Lane Grp Cap (vph)	438	448	546		213	184	157	1048		50	860	884
v/s Ratio Prot	c0.08	0.08	0.00		c0.04		c0.03	c0.06		0.01	c0.08	0.04
v/s Ratio Perm			0.01			0.00						0.05
v/c Ratio	0.29	0.29	0.04		0.38	0.02	0.38	0.18		0.48	0.34	0.15
Uniform Delay, d1	25.2	25.1	18.1		34.7	33.2	36.4	21.4		40.7	26.3	11.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.0		1.1	0.0	0.6	0.2		2.6	0.7	0.0
Delay (s)	25.3	25.3	18.1		35.8	33.2	36.9	21.7		43.3	27.0	11.1
Level of Service	C	C	B		D	C	D	C		D	C	B
Approach Delay (s)		23.9			35.2			25.3			20.5	
Approach LOS		C			D			C			C	

Intersection Summary

HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	30.0
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
6: Road 20 & Paseo Way

Existing - AM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗	↑	↙	↘
Traffic Volume (veh/h)	13	279	248	11	12	21
Future Volume (Veh/h)	13	279	248	11	12	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.79	0.79	0.92	0.92
Hourly flow rate (vph)	18	388	314	14	13	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		644	715			
pX, platoon unblocked						
vC, conflicting volume	328				745	321
vC1, stage 1 conf vol					321	
vC2, stage 2 conf vol					424	
vCu, unblocked vol	328				745	321
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	97
cM capacity (veh/h)	1232				568	720
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	18	388	328	36		
Volume Left	18	0	0	13		
Volume Right	0	0	14	23		
cSH	1232	1700	1700	657		
Volume to Capacity	0.01	0.23	0.19	0.05		
Queue Length 95th (ft)	1	0	0	4		
Control Delay (s)	8.0	0.0	0.0	10.8		
Lane LOS	A			B		
Approach Delay (s)	0.4		0.0	10.8		
Approach LOS				B		
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			24.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis  
7: Road 20 & Abella Circle West

Existing - AM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↙	↘
Traffic Volume (vph)	11	269	228	17	25	22
Future Volume (vph)	11	269	228	17	25	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1845		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1845		1770	1583
Peak-hour factor, PHF	0.74	0.74	0.73	0.73	0.78	0.78
Adj. Flow (vph)	15	364	312	23	32	28
RTOR Reduction (vph)	0	0	2	0	0	26
Lane Group Flow (vph)	15	364	333	0	32	2
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases						8
Actuated Green, G (s)	0.9	27.5	22.6		2.2	2.2
Effective Green, g (s)	0.9	27.5	22.6		2.2	2.2
Actuated g/C Ratio	0.02	0.73	0.60		0.06	0.06
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	4.0	4.0		2.0	2.0
Lane Grp Cap (vph)	42	1358	1106		103	92
v/s Ratio Prot	0.01	c0.20	c0.18		c0.02	
v/s Ratio Perm						0.00
v/c Ratio	0.36	0.27	0.30		0.31	0.02
Uniform Delay, d1	18.1	1.7	3.7		17.0	16.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.9	0.1	0.2		0.6	0.0
Delay (s)	20.0	1.9	3.9		17.7	16.8
Level of Service	C	A	A		B	B
Approach Delay (s)		2.6	3.9		17.2	
Approach LOS		A	A		B	

Intersection Summary

HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
8: Abella Circle East & Road 20

Existing - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop				Stop			Stop			Stop	
Traffic Volume (vph)	7	177	0	0	220	30	61	0	77	39	0	8
Future Volume (vph)	7	177	0	0	220	30	61	0	77	39	0	8
Peak Hour Factor	0.78	0.78	0.78	0.90	0.90	0.90	0.66	0.66	0.66	0.69	0.69	0.69
Hourly flow rate (vph)	9	227	0	0	244	33	92	0	117	57	0	12
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	9	227	277	209	69							
Volume Left (vph)	9	0	0	92	57							
Volume Right (vph)	0	0	33	117	12							
Hadj (s)	0.53	0.03	-0.04	-0.21	0.09							
Departure Headway (s)	6.1	5.6	5.1	5.2	5.7							
Degree Utilization, x	0.02	0.36	0.39	0.30	0.11							
Capacity (veh/h)	551	606	667	632	552							
Control Delay (s)	8.0	10.5	11.4	10.4	9.4							
Approach Delay (s)	10.4		11.4	10.4	9.4							
Approach LOS	B		B	B	A							
Intersection Summary												
Delay			10.7									
Level of Service			B									
Intersection Capacity Utilization			27.8%		ICU Level of Service	A						
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
 9: EI Portal Dr/EI Portal Dr. & Road 20/Private Driveway

Existing - AM Peak  
 01/05/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	0	0	0	0	4	153	627	0	0	570	97
Future Volume (vph)	52	0	0	0	0	4	153	627	0	0	570	97
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
Lane Util. Factor	1.00					1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00					1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00					1.00	1.00	1.00			1.00	1.00
Frt	1.00					0.86	1.00	1.00			1.00	0.85
Flt Protected	0.95					1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770					1315	1752	3505			3505	1568
Flt Permitted	0.95					1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770					1315	1752	3505			3505	1568
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	55	0	0	0	0	4	163	667	0	0	606	103
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	0	0	0	61
Lane Group Flow (vph)	55	0	0	0	0	0	163	667	0	0	606	42
Confl. Peds. (#/hr)							2		3	3		2
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	2%	2%	2%	25%	25%	25%	3%	3%	3%	3%	3%	3%
Turn Type	Prot					Perm	Prot	NA			NA	Prot
Protected Phases	4						2				6	6
Permitted Phases						8		2				
Actuated Green, G (s)	5.4					5.4	16.4	16.4			16.4	16.4
Effective Green, g (s)	5.4					5.4	16.4	16.4			16.4	16.4
Actuated g/C Ratio	0.11					0.11	0.33	0.33			0.33	0.33
Clearance Time (s)	4.0					4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0					3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	190					141	572	1145			1145	512
v/s Ratio Prot	c0.03						0.09				c0.17	0.03
v/s Ratio Perm						0.00		c0.19				
v/c Ratio	0.29					0.00	0.28	0.58			0.53	0.08
Uniform Delay, d1	20.6					20.0	12.5	14.1			13.8	11.7
Progression Factor	1.00					1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.8					0.0	1.2	2.2			1.8	0.3
Delay (s)	21.5					20.0	13.8	16.2			15.5	12.0
Level of Service	C					C	B	B			B	B
Approach Delay (s)		21.5			20.0			15.7			15.0	
Approach LOS		C			C			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			15.6									B
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			50.2							12.0		
Intersection Capacity Utilization			37.6%									A
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
10: Church Ln & El Portal Dr

Existing - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	470	259	321	556	20	103	126	286	12	270	121
Future Volume (vph)	82	470	259	321	556	20	103	126	286	12	270	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	4.0	5.0	5.0		4.0	4.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00		0.95	0.95
Frbp, ped/bikes	1.00	1.00	0.92	1.00	1.00		1.00	1.00	1.00		1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	3539	1455	1770	3521		1770	1863	1583		1766	1409
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.49	1.00
Satd. Flow (perm)	1770	3539	1455	1770	3521		1770	1863	1583		876	1409
Peak-hour factor, PHF	0.85	0.92	0.85	0.92	0.92	0.92	0.79	0.79	0.92	0.92	0.85	0.85
Adj. Flow (vph)	96	511	305	349	604	22	130	159	311	13	318	142
RTOR Reduction (vph)	0	0	258	0	2	0	0	0	268	0	0	89
Lane Group Flow (vph)	96	511	47	349	624	0	130	159	43	0	331	53
Confl. Peds. (#/hr)	26		14				29					29
Confl. Bikes (#/hr)												2
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		8	8			4	
Permitted Phases			2						8	4		4
Actuated Green, G (s)	9.1	18.0	18.0	24.0	32.9		17.3	17.3	17.3		45.0	45.0
Effective Green, g (s)	10.1	18.0	19.0	24.0	32.9		18.3	18.3	17.3		46.0	46.0
Actuated g/C Ratio	0.08	0.14	0.15	0.19	0.26		0.15	0.15	0.14		0.37	0.37
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0	6.0	2.5	6.0		4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	143	512	222	341	931		260	274	220		324	521
v/s Ratio Prot	0.05	c0.14		c0.20	0.18		0.07	c0.09				
v/s Ratio Perm			0.03						0.03		c0.38	0.04
v/c Ratio	0.67	1.00	0.21	1.02	0.67		0.50	0.58	0.20		1.02	0.10
Uniform Delay, d1	55.5	53.1	46.1	50.1	40.8		48.8	49.4	47.4		39.1	25.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	9.3	39.2	1.3	54.9	2.9		2.1	3.7	0.6		55.6	0.1
Delay (s)	64.8	92.3	47.4	105.0	43.8		50.8	53.1	48.0		94.8	25.7
Level of Service	E	F	D	F	D		D	D	D		F	C
Approach Delay (s)		74.4			65.7			49.9			74.1	
Approach LOS		E			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			66.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			124.3			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			70.1%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

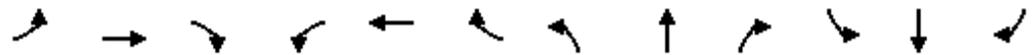
HCM Signalized Intersection Capacity Analysis  
1: Giant Road & Parr Boulevard/Road 20

Existing - PM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	99	46	2	30	25	16	208	9	11	112	38
Future Volume (vph)	170	99	46	2	30	25	16	208	9	11	112	38
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		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.95		1.00	0.93		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1745		1719	1688		1752	1834			1873	1599
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (perm)	1752	1745		1719	1688		1752	1834			1813	1599
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	104	48	2	32	26	17	219	9	12	118	40
RTOR Reduction (vph)	0	15	0	0	24	0	0	2	0	0	0	27
Lane Group Flow (vph)	179	137	0	2	34	0	17	226	0	0	130	13
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	3%	3%	3%	1%	1%	1%
Turn Type	Split	NA		Split	NA		Prot	NA		Perm	NA	Perm
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases										6		6
Actuated Green, G (s)	11.2	11.2		3.8	3.8		0.9	21.7			15.8	15.8
Effective Green, g (s)	11.2	11.2		3.8	3.8		0.9	21.7			15.8	15.8
Actuated g/C Ratio	0.23	0.23		0.08	0.08		0.02	0.44			0.32	0.32
Clearance Time (s)	4.0	4.0		4.0	4.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	4.0	4.0		3.0	3.0		2.0	4.0			4.0	4.0
Lane Grp Cap (vph)	394	393		131	129		31	800			576	508
v/s Ratio Prot	c0.10	0.08		0.00	c0.02		0.01	c0.12				
v/s Ratio Perm											0.07	0.01
v/c Ratio	0.45	0.35		0.02	0.26		0.55	0.28			0.23	0.03
Uniform Delay, d1	16.6	16.2		21.2	21.6		24.2	9.0			12.5	11.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.1	0.7		0.0	1.1		10.2	0.3			0.3	0.0
Delay (s)	17.7	16.9		21.3	22.7		34.4	9.3			12.7	11.7
Level of Service	B	B		C	C		C	A			B	B
Approach Delay (s)		17.4			22.7			11.0			12.5	
Approach LOS		B			C			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			14.8									B
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			49.7							18.0		
Intersection Capacity Utilization			40.0%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
2: Rumrill Blvd. & Broadway Ave.

Existing - PM Peak  
01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	24	182	12	190	268	20	29	686	304	15	288	32
Future Volume (vph)	24	182	12	190	268	20	29	686	304	15	288	32
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	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	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1861		1770	1841		1787	3574	1590	1787	3574	1577
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1861		1770	1841		1787	3574	1590	1787	3574	1577
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	25	188	12	196	276	21	30	707	313	15	297	33
RTOR Reduction (vph)	0	3	0	0	3	0	0	0	92	0	0	18
Lane Group Flow (vph)	25	197	0	196	294	0	30	707	221	15	297	15
Confl. Peds. (#/hr)	4		14	14		4	3		1	1		3
Confl. Bikes (#/hr)			2			4						
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	8	8		4	4		1	6	4	5	2	8
Permitted Phases									6			2
Actuated Green, G (s)	17.2	17.2		30.4	30.4		4.1	24.6	55.0	1.3	21.8	39.0
Effective Green, g (s)	18.2	18.2		31.4	31.4		5.1	26.1	57.0	2.3	23.3	41.0
Actuated g/C Ratio	0.20	0.20		0.35	0.35		0.06	0.29	0.63	0.03	0.26	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5	4.0	4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	4.0	2.0	2.0	4.0	2.0
Lane Grp Cap (vph)	361	376		617	642		101	1036	1007	45	925	718
v/s Ratio Prot	0.01	c0.11		0.11	c0.16		c0.02	c0.20	0.08	0.01	0.08	0.00
v/s Ratio Perm									0.06			0.01
v/c Ratio	0.07	0.52		0.32	0.46		0.30	0.68	0.22	0.33	0.32	0.02
Uniform Delay, d1	29.0	32.0		21.5	22.7		40.7	28.3	7.0	43.1	27.0	13.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.6		1.4	2.4		0.6	2.0	0.2	1.6	0.3	0.0
Delay (s)	29.1	32.6		22.8	25.1		41.3	30.3	7.2	44.7	27.2	13.5
Level of Service	C	C		C	C		D	C	A	D	C	B
Approach Delay (s)		32.2			24.2			23.7			26.7	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 3: San Pablo Ave. & Broadway Ave./El Portal Dr.

Existing - PM Peak  
 01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	384	134	75	274	135	199	875	76	137	491	16
Future Volume (vph)	21	384	134	75	274	135	199	875	76	137	491	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1747	3384		1770	3539	1533	1770	3539	1583	1770	3539	1535
Flt Permitted	0.55	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1004	3384		1770	3539	1533	1770	3539	1583	1770	3539	1535
Peak-hour factor, PHF	0.88	0.88	0.88	0.80	0.80	0.80	0.90	0.90	0.90	0.89	0.89	0.89
Adj. Flow (vph)	24	436	152	94	342	169	221	972	84	154	552	18
RTOR Reduction (vph)	0	34	0	0	0	110	0	0	26	0	0	11
Lane Group Flow (vph)	24	554	0	94	343	59	221	972	58	154	552	7
Confl. Peds. (#/hr)	16		7	7		16	13					13
Confl. Bikes (#/hr)												5
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases		4		3	8		5	2	3	1	6	
Permitted Phases	4					8			2			6
Actuated Green, G (s)	23.4	23.4		9.3	37.2	37.2	17.6	45.8	55.1	12.5	40.7	40.7
Effective Green, g (s)	24.4	24.4		10.8	38.2	38.2	19.1	48.8	58.1	14.0	43.7	43.7
Actuated g/C Ratio	0.22	0.22		0.10	0.35	0.35	0.17	0.44	0.53	0.13	0.40	0.40
Clearance Time (s)	4.0	4.0		4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	6.0
Vehicle Extension (s)	2.5	2.5		2.0	2.5	2.5	2.0	5.0	2.0	2.0	5.0	5.0
Lane Grp Cap (vph)	222	750		173	1228	532	307	1570	836	225	1405	609
v/s Ratio Prot		c0.16		c0.05	0.10		c0.12	c0.27	0.01	0.09	0.16	
v/s Ratio Perm	0.02					0.04			0.03			0.00
v/c Ratio	0.11	0.74		0.54	0.28	0.11	0.72	0.62	0.07	0.68	0.39	0.01
Uniform Delay, d1	34.1	39.8		47.3	26.0	24.4	42.9	23.5	12.7	45.9	23.7	20.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.36	1.00	1.00	1.33	0.82	1.00
Incremental Delay, d2	0.2	3.6		1.9	0.1	0.1	5.6	1.6	0.0	6.1	0.7	0.0
Delay (s)	34.3	43.4		49.1	26.0	24.4	63.9	25.1	12.7	67.1	20.2	20.1
Level of Service	C	D		D	C	C	E	C	B	E	C	C
Approach Delay (s)		43.1			29.2			31.0			30.2	
Approach LOS		D			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			32.8									C
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			110.0						12.0			
Intersection Capacity Utilization			67.8%									C
Analysis Period (min)			15									

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

Existing - PM Peak

## 4: Mission Bell Dr & El Portal Dr.

01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	386	80	22	358	35	0	0	45	57	14	23
Future Volume (Veh/h)	20	386	80	22	358	35	0	0	45	57	14	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	420	87	24	389	38	0	0	49	62	15	25
Pedestrians		1						2				
Lane Width (ft)		12.0						12.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		264										
pX, platoon unblocked												
vC, conflicting volume	427			509			786	984	256	710	1009	214
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	427			509			786	984	256	710	1009	214
tC, single (s)	4.2			4.1			7.5	6.5	6.9	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			98			100	100	93	78	93	97
cM capacity (veh/h)	1122			1058			253	239	749	278	218	769
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>WB 3</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>				
Volume Total	232	297	24	259	168	49	62	40				
Volume Left	22	0	24	0	0	0	62	0				
Volume Right	0	87	0	0	38	49	0	25				
cSH	1122	1700	1058	1700	1700	749	278	394				
Volume to Capacity	0.02	0.17	0.02	0.15	0.10	0.07	0.22	0.10				
Queue Length 95th (ft)	1	0	2	0	0	5	21	8				
Control Delay (s)	1.0	0.0	8.5	0.0	0.0	10.1	21.6	15.2				
Lane LOS	A		A			B	C	C				
Approach Delay (s)	0.4		0.5			10.1	19.1					
Approach LOS						B	C					
<b>Intersection Summary</b>												
Average Delay			2.5									
Intersection Capacity Utilization			38.5%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
5: San Pablo Ave. & 23rd St./Road 20

Existing - PM Peak

01/05/2022



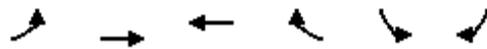
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘		↖	↗	↘	↕		↖	↗	↘
Traffic Volume (vph)	454	92	87	17	91	40	99	528	32	44	279	357
Future Volume (vph)	454	92	87	17	91	40	99	528	32	44	279	357
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96		1.00	1.00	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1730	1542		1848	1583	1770	3498		1770	3539	1555
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1698	1730	1542		1848	1583	1770	3498		1770	3539	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	468	95	90	18	94	41	102	544	33	45	288	368
RTOR Reduction (vph)	0	0	47	0	0	36	0	2	0	0	0	196
Lane Group Flow (vph)	281	282	43	0	112	5	102	575	0	45	288	172
Confl. Peds. (#/hr)			15	15			8		12	12		8
Confl. Bikes (#/hr)			2						1			1
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA	pm+ov	Split	NA	Perm	Prot	NA		Prot	NA	pm+ov
Protected Phases	4	4	5	8	8		5	2		1	6	4
Permitted Phases			4			8						6
Actuated Green, G (s)	26.5	26.5	38.9		13.8	13.8	12.4	31.5		6.4	25.5	52.0
Effective Green, g (s)	26.5	26.5	38.9		13.8	13.8	12.4	31.5		6.4	25.5	52.0
Actuated g/C Ratio	0.24	0.24	0.35		0.12	0.12	0.11	0.28		0.06	0.23	0.47
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	5.0		2.0	5.0	2.0
Lane Grp Cap (vph)	405	413	540		229	196	197	992		102	813	728
v/s Ratio Prot	c0.17	0.16	0.01		c0.06		c0.06	c0.16		0.03	0.08	0.06
v/s Ratio Perm			0.02			0.00						0.05
v/c Ratio	0.69	0.68	0.08		0.49	0.03	0.52	0.58		0.44	0.35	0.24
Uniform Delay, d1	38.5	38.4	24.1		45.3	42.7	46.5	34.1		50.6	35.8	17.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.1	3.7	0.0		1.6	0.1	1.0	1.3		1.1	0.6	0.1
Delay (s)	42.7	42.1	24.1		47.0	42.7	47.4	35.4		51.7	36.4	17.7
Level of Service	D	D	C		D	D	D	D		D	D	B
Approach Delay (s)		39.9			45.8			37.2			27.6	
Approach LOS		D			D			D			C	

Intersection Summary

HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	111.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
6: Road 20 & Paseo Way

Existing - PM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	222	204	9	7	16
Future Volume (Veh/h)	10	222	204	9	7	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.48	0.48	0.72	0.72
Hourly flow rate (vph)	14	304	425	19	10	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		650	715			
pX, platoon unblocked						
vC, conflicting volume	444				766	434
vC1, stage 1 conf vol					434	
vC2, stage 2 conf vol					332	
vCu, unblocked vol	444				766	434
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	96
cM capacity (veh/h)	1116				562	622
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	14	304	444	32		
Volume Left	14	0	0	10		
Volume Right	0	0	19	22		
cSH	1116	1700	1700	602		
Volume to Capacity	0.01	0.18	0.26	0.05		
Queue Length 95th (ft)	1	0	0	4		
Control Delay (s)	8.3	0.0	0.0	11.3		
Lane LOS	A			B		
Approach Delay (s)	0.4		0.0	11.3		
Approach LOS				B		
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			21.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis  
7: Road 20 & Abella Circle West

Existing - PM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	269	191	27	15	25
Future Volume (vph)	11	269	191	27	15	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1832		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1832		1770	1583
Peak-hour factor, PHF	0.72	0.72	0.53	0.53	0.77	0.77
Adj. Flow (vph)	15	374	360	51	19	32
RTOR Reduction (vph)	0	0	4	0	0	30
Lane Group Flow (vph)	15	374	407	0	19	2
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases						8
Actuated Green, G (s)	0.9	29.0	24.1		2.0	2.0
Effective Green, g (s)	0.9	29.0	24.1		2.0	2.0
Actuated g/C Ratio	0.02	0.74	0.62		0.05	0.05
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	4.0	4.0		2.0	2.0
Lane Grp Cap (vph)	40	1385	1132		90	81
v/s Ratio Prot	0.01	c0.20	c0.22		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.38	0.27	0.36		0.21	0.02
Uniform Delay, d1	18.8	1.6	3.7		17.7	17.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.1	0.1	0.3		0.4	0.0
Delay (s)	20.9	1.7	3.9		18.2	17.6
Level of Service	C	A	A		B	B
Approach Delay (s)		2.5	3.9		17.8	
Approach LOS		A	A		B	

Intersection Summary

HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
8: Abella Circle East & Road 20

Existing - PM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop				Stop			Stop			Stop	
Traffic Volume (vph)	14	179	0	0	188	34	32	0	45	23	0	11
Future Volume (vph)	14	179	0	0	188	34	32	0	45	23	0	11
Peak Hour Factor	0.64	0.64	0.64	0.78	0.78	0.78	0.36	0.36	0.36	0.80	0.80	0.80
Hourly flow rate (vph)	22	280	0	0	241	44	89	0	125	29	0	14
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	22	280	285	214	43							
Volume Left (vph)	22	0	0	89	29							
Volume Right (vph)	0	0	44	125	14							
Hadj (s)	0.53	0.03	-0.06	-0.23	-0.03							
Departure Headway (s)	6.1	5.6	5.1	5.3	5.8							
Degree Utilization, x	0.04	0.43	0.41	0.31	0.07							
Capacity (veh/h)	558	617	667	619	531							
Control Delay (s)	8.1	11.6	11.6	10.6	9.2							
Approach Delay (s)	11.4		11.6	10.6	9.2							
Approach LOS	B		B	B	A							
Intersection Summary												
Delay			11.1									
Level of Service			B									
Intersection Capacity Utilization			23.3%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
 9: EI Portal Dr/EI Portal Dr. & Road 20/Private Driveway

Existing - PM Peak  
 01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖					↖	↖	↕			↕	↖
Traffic Volume (vph)	52	0	0	0	0	3	163	582	0	0	701	59
Future Volume (vph)	52	0	0	0	0	3	163	582	0	0	701	59
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
Lane Util. Factor	1.00					1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00					1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00					1.00	1.00	1.00			1.00	1.00
Frt	1.00					0.86	1.00	1.00			1.00	0.85
Flt Protected	0.95					1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1736					1644	1770	3539			3574	1599
Flt Permitted	0.95					1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1736					1644	1770	3539			3574	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	54	0	0	0	0	3	170	606	0	0	730	61
RTOR Reduction (vph)	0	0	0	0	0	3	0	0	0	0	0	40
Lane Group Flow (vph)	54	0	0	0	0	0	170	606	0	0	730	21
Confl. Peds. (#/hr)			10	10			8		6	6		8
Confl. Bikes (#/hr)									4			1
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Turn Type	Prot					Perm	Prot	NA			NA	Prot
Protected Phases	4						2				6	6
Permitted Phases						8		2				
Actuated Green, G (s)	2.9					2.9	16.3	16.3			16.3	16.3
Effective Green, g (s)	2.9					2.9	16.3	16.3			16.3	16.3
Actuated g/C Ratio	0.06					0.06	0.34	0.34			0.34	0.34
Clearance Time (s)	4.0					4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0					3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	105					100	607	1214			1226	548
v/s Ratio Prot	c0.03						0.10				c0.20	0.01
v/s Ratio Perm						0.00		c0.17				
v/c Ratio	0.51					0.00	0.28	0.50			0.60	0.04
Uniform Delay, d1	21.6					20.9	11.3	12.4			12.9	10.4
Progression Factor	1.00					1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	4.2					0.0	1.1	1.5			2.1	0.1
Delay (s)	25.8					20.9	12.5	13.8			15.0	10.5
Level of Service	C					C	B	B			B	B
Approach Delay (s)		25.8			20.9			13.5			14.7	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
10: Church Ln & El Portal Dr

Existing - PM Peak

01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	593	188	273	532	21	128	199	308	19	137	85
Future Volume (vph)	115	593	188	273	532	21	128	199	308	19	137	85
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	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99		1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1770	3539	1535	1770	3510		1770	1863	1562		1851	1524
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	1.00
Satd. Flow (perm)	1770	3539	1535	1770	3510		1770	1863	1562		1851	1524
Peak-hour factor, PHF	0.91	0.91	0.91	0.88	0.88	0.88	0.98	0.98	0.98	0.80	0.80	0.80
Adj. Flow (vph)	126	652	207	310	605	24	131	203	314	24	171	106
RTOR Reduction (vph)	0	0	152	0	2	0	0	0	261	0	0	89
Lane Group Flow (vph)	126	652	55	310	627	0	131	203	53	0	195	17
Confl. Peds. (#/hr)	13		2	2		13	14					14
Confl. Bikes (#/hr)			2						1			3
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	11.9	28.6	28.6	23.8	40.5		18.3	18.3	18.3		17.1	17.1
Effective Green, g (s)	11.9	28.6	28.6	23.8	40.5		18.3	18.3	18.3		17.1	17.1
Actuated g/C Ratio	0.11	0.27	0.27	0.22	0.38		0.17	0.17	0.17		0.16	0.16
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0	6.0	2.5	6.0		4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	195	938	407	390	1318		300	316	265		293	241
v/s Ratio Prot	0.07	c0.18		c0.18	0.18		0.07	c0.11			c0.11	
v/s Ratio Perm			0.04						0.03			0.01
v/c Ratio	0.65	0.70	0.13	0.79	0.48		0.44	0.64	0.20		0.67	0.07
Uniform Delay, d1	45.9	35.7	30.2	39.7	25.6		40.1	41.7	38.5		42.7	38.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.4	3.4	0.4	10.4	0.8		1.4	4.9	0.5		6.2	0.2
Delay (s)	51.3	39.0	30.6	50.0	26.3		41.5	46.6	39.0		48.8	38.8
Level of Service	D	D	C	D	C		D	D	D		D	D
Approach Delay (s)		38.8			34.2			41.9			45.3	
Approach LOS		D			C			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			38.7			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			107.8			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			70.4%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
1: Giant Road & Parr Boulevard/Road 20

Alternative 1 - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	23	30	3	54	20	35	89	1	10	85	67
Future Volume (vph)	35	23	30	3	54	20	35	89	1	10	85	67
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		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.96		1.00	1.00		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1456	1401		1787	1791		1719	1807		1703	1674	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.69	1.00	
Satd. Flow (perm)	1456	1401		1787	1791		1719	1807		1245	1674	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	37	24	32	3	57	21	37	95	1	11	90	71
RTOR Reduction (vph)	0	29	0	0	17	0	0	0	0	0	23	0
Lane Group Flow (vph)	37	27	0	3	61	0	37	96	0	11	138	0
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	24%	24%	24%	1%	1%	1%	5%	5%	5%	6%	6%	6%
Turn Type	Split	NA		Split	NA		Prot	NA		Perm	NA	
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)	4.4	4.4		4.2	4.2		2.1	29.2		22.1	22.1	
Effective Green, g (s)	4.4	4.4		4.2	4.2		2.1	29.2		22.1	22.1	
Actuated g/C Ratio	0.09	0.09		0.08	0.08		0.04	0.57		0.44	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0		3.0	3.0		2.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	126	121		147	148		71	1038		541	728	
v/s Ratio Prot	c0.03	0.02		0.00	c0.03		c0.02	0.05			c0.08	
v/s Ratio Perm										0.01		
v/c Ratio	0.29	0.22		0.02	0.41		0.52	0.09		0.02	0.19	
Uniform Delay, d1	21.7	21.6		21.4	22.1		23.9	4.8		8.2	8.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	1.3		0.1	1.8		3.2	0.1		0.0	0.2	
Delay (s)	23.5	22.9		21.5	24.0		27.0	4.9		8.2	9.0	
Level of Service	C	C		C	C		C	A		A	A	
Approach Delay (s)		23.1			23.9			11.1			9.0	
Approach LOS		C			C			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			14.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			50.8			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			45.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
2: Rumrill Blvd. & Broadway Ave.

Alternative 1 - AM Peak

01/05/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	10	224	6	137	130	9	10	238	188	8	255	8	
Future Volume (vph)	10	224	6	137	130	9	10	238	188	8	255	8	
Ideal Flow (vphp)	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	4.5		4.0	4.5		
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	1.00		1.00	0.99		1.00	0.93		1.00	1.00		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1770	1853		1746	1824		1717	1680		1719	1799		
Flt Permitted	0.95	1.00		0.46	1.00		0.41	1.00		0.20	1.00		
Satd. Flow (perm)	1770	1853		848	1824		746	1680		361	1799		
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)	11	243	7	149	141	10	11	259	204	9	277	9	
RTOR Reduction (vph)	0	1	0	0	0	0	0	30	0	0	0	0	
Lane Group Flow (vph)	11	249	0	149	151	0	11	433	0	9	286	0	
Confl. Peds. (#/hr)	5		9	9		5	3		1	1		3	
Confl. Bikes (#/hr)			1			1							
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	5%	5%	5%	5%	5%	5%	
Turn Type	Prot	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases				8			2			6			
Actuated Green, G (s)	1.2	34.2		49.2	44.0		29.1	27.9		27.5	27.1		
Effective Green, g (s)	1.2	34.2		49.2	44.0		29.1	27.9		27.5	27.1		
Actuated g/C Ratio	0.01	0.38		0.55	0.49		0.32	0.31		0.31	0.30		
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	4.0		2.0	4.0		
Lane Grp Cap (vph)	23	704		573	891		254	520		116	541		
v/s Ratio Prot	0.01	c0.13		c0.03	0.08		c0.00	c0.26		0.00	0.16		
v/s Ratio Perm				0.11			0.01			0.02			
v/c Ratio	0.48	0.35		0.26	0.17		0.04	0.83		0.08	0.53		
Uniform Delay, d1	44.1	20.0		10.6	12.8		21.1	28.9		23.3	26.1		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	5.6	1.4		0.1	0.0		0.0	11.4		0.1	1.2		
Delay (s)	49.7	21.4		10.7	12.9		21.1	40.3		23.4	27.4		
Level of Service	D	C		B	B		C	D		C	C		
Approach Delay (s)		22.6			11.8			39.9			27.2		
Approach LOS		C			B			D			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			27.3									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.52										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	16.5
Intersection Capacity Utilization			63.7%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
3: San Pablo Ave. & Broadway Ave./El Portal Dr.

Alternative 1 - AM Peak

01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	530	110	78	285	79	140	352	104	206	673	18
Future Volume (vph)	21	530	110	78	285	79	140	352	104	206	673	18
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	4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1757	1863	1551	1770	3539	1545	1770	3539	1561	1770	3523	
Flt Permitted	0.51	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	938	1863	1551	1770	3539	1545	1770	3539	1561	1770	3523	
Peak-hour factor, PHF	0.81	0.81	0.81	0.68	0.68	0.68	0.91	0.91	0.91	0.79	0.79	0.79
Adj. Flow (vph)	26	654	136	115	419	116	154	387	114	261	852	23
RTOR Reduction (vph)	0	0	84	0	0	63	0	0	61	0	2	0
Lane Group Flow (vph)	26	654	52	115	419	53	154	387	53	261	873	0
Confl. Peds. (#/hr)	9		8	8		9	11		5	5		11
Turn Type	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases		4		3	8		5	2	3	1	6	
Permitted Phases	4		4			8			2			
Actuated Green, G (s)	35.0	35.0	35.0	7.3	46.8	46.8	11.3	25.2	32.5	15.5	29.4	
Effective Green, g (s)	35.0	35.0	35.0	7.3	46.8	46.8	11.3	25.2	32.5	15.5	29.4	
Actuated g/C Ratio	0.34	0.34	0.34	0.07	0.46	0.46	0.11	0.25	0.32	0.15	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.0	2.5	2.5	2.0	6.0	2.0	2.0	6.0	
Lane Grp Cap (vph)	321	639	532	126	1623	708	196	874	497	268	1015	
v/s Ratio Prot		c0.35		c0.06	0.12		0.09	0.11	0.01	c0.15	c0.25	
v/s Ratio Perm	0.03		0.03			0.03			0.03			
v/c Ratio	0.08	1.02	0.10	0.91	0.26	0.08	0.79	0.44	0.11	0.97	0.86	
Uniform Delay, d1	22.6	33.5	22.8	47.0	16.9	15.5	44.2	32.5	24.5	43.0	34.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.26	1.40	1.42	1.47	0.64	
Incremental Delay, d2	0.1	41.7	0.1	53.2	0.1	0.0	16.3	1.5	0.0	44.2	8.5	
Delay (s)	22.7	75.2	22.8	100.2	17.0	15.5	71.9	46.9	34.9	107.6	30.6	
Level of Service	C	E	C	F	B	B	E	D	C	F	C	
Approach Delay (s)		64.8			31.5			50.7			48.3	
Approach LOS		E			C			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			49.6		HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			102.0		Sum of lost time (s)				19.0			
Intersection Capacity Utilization			80.3%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
4: Mission Bell Dr & El Portal Dr.

Alternative 1 - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	291	71	29	230	23	0	0	43	42	15	17
Future Volume (Veh/h)	24	291	71	29	230	23	0	0	43	42	15	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	300	73	30	237	24	0	0	44	43	15	18
Pedestrians		2			2			5			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		264										
pX, platoon unblocked												
vC, conflicting volume	262			378			716	714	344	662	738	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262			378			716	714	344	662	738	252
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			97			100	100	94	87	95	98
cM capacity (veh/h)	1284			1165			313	342	700	327	318	763
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	25	373	30	261	44	43	33					
Volume Left	25	0	30	0	0	43	0					
Volume Right	0	73	0	24	44	0	18					
cSH	1284	1700	1165	1700	700	327	467					
Volume to Capacity	0.02	0.22	0.03	0.15	0.06	0.13	0.07					
Queue Length 95th (ft)	1	0	2	0	5	11	6					
Control Delay (s)	7.9	0.0	8.2	0.0	10.5	17.7	13.3					
Lane LOS	A		A		B	C	B					
Approach Delay (s)	0.5		0.8		10.5	15.8						
Approach LOS					B	C						
<b>Intersection Summary</b>												
Average Delay			2.6									
Intersection Capacity Utilization			37.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
5: San Pablo Ave. & 23rd St./Road 20

Alternative 1 - AM Peak  
01/05/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	195	52	59	21	56	25	58	167	16	23	281	251	
Future Volume (vph)	195	52	59	21	56	25	58	167	16	23	281	251	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85	
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1681	1720	1551		1820	1568	1719	3381		1736	3471	1527	
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	1681	1720	1551		1820	1568	1719	3381		1736	3471	1527	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	203	54	61	22	58	26	60	174	17	24	293	261	
RTOR Reduction (vph)	0	0	39	0	0	23	0	3	0	0	0	128	
Lane Group Flow (vph)	128	129	22	0	80	3	60	188	0	24	293	133	
Confl. Peds. (#/hr)			5	5			9			7	7	9	
Confl. Bikes (#/hr)									2				
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	5%	5%	5%	4%	4%	4%	
Turn Type	Split	NA	pm+ov	Split	NA	Perm	Prot	NA		Prot	NA	pm+ov	
Protected Phases	4	4	5	8	8		5	2		1	6	4	
Permitted Phases			4			8						6	
Actuated Green, G (s)	22.2	22.2	30.0		10.0	10.0	7.8	26.4		2.5	21.1	43.3	
Effective Green, g (s)	22.2	22.2	30.0		10.0	10.0	7.8	26.4		2.5	21.1	43.3	
Actuated g/C Ratio	0.26	0.26	0.35		0.12	0.12	0.09	0.31		0.03	0.25	0.51	
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	6.0		2.0	6.0	2.0	
Lane Grp Cap (vph)	438	448	546		213	184	157	1048		50	860	884	
v/s Ratio Prot	c0.08	0.08	0.00		c0.04		c0.03	c0.06		0.01	c0.08	0.04	
v/s Ratio Perm			0.01			0.00						0.05	
v/c Ratio	0.29	0.29	0.04		0.38	0.02	0.38	0.18		0.48	0.34	0.15	
Uniform Delay, d1	25.2	25.1	18.1		34.7	33.2	36.4	21.4		40.7	26.3	11.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.1	0.0		1.1	0.0	0.6	0.2		2.6	0.7	0.0	
Delay (s)	25.3	25.3	18.1		35.8	33.2	36.9	21.7		43.3	27.0	11.1	
Level of Service	C	C	B		D	C	D	C		D	C	B	
Approach Delay (s)		23.9			35.2			25.3			20.5		
Approach LOS		C			D			C			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			23.6									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.37										
Actuated Cycle Length (s)			85.1									Sum of lost time (s)	30.0
Intersection Capacity Utilization			43.0%									ICU Level of Service	A
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
6: Road 20 & Paseo Way

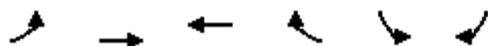
Alternative 1 - AM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	279	248	11	12	21
Future Volume (Veh/h)	13	279	248	11	12	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.79	0.79	0.92	0.92
Hourly flow rate (vph)	18	388	314	14	13	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		644	715			
pX, platoon unblocked						
vC, conflicting volume	328				745	321
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	328				745	321
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	97
cM capacity (veh/h)	1232				376	720
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	406	328	36			
Volume Left	18	0	13			
Volume Right	0	14	23			
cSH	1232	1700	541			
Volume to Capacity	0.01	0.19	0.07			
Queue Length 95th (ft)	1	0	5			
Control Delay (s)	0.5	0.0	12.1			
Lane LOS	A		B			
Approach Delay (s)	0.5	0.0	12.1			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			35.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis  
7: Road 20 & Abella Circle West

Alternative 1 - AM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	269	228	17	25	22
Future Volume (vph)	11	269	228	17	25	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1845		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1845		1770	1583
Peak-hour factor, PHF	0.74	0.74	0.73	0.73	0.78	0.78
Adj. Flow (vph)	15	364	312	23	32	28
RTOR Reduction (vph)	0	0	3	0	0	26
Lane Group Flow (vph)	15	364	332	0	32	2
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases						8
Actuated Green, G (s)	1.0	27.5	22.5		3.2	3.2
Effective Green, g (s)	1.0	27.5	22.5		3.2	3.2
Actuated g/C Ratio	0.03	0.71	0.58		0.08	0.08
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	4.0	4.0		2.0	2.0
Lane Grp Cap (vph)	45	1323	1072		146	130
v/s Ratio Prot	0.01	c0.20	c0.18		c0.02	
v/s Ratio Perm						0.00
v/c Ratio	0.33	0.28	0.31		0.22	0.02
Uniform Delay, d1	18.5	2.0	4.1		16.6	16.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.2	0.2		0.3	0.0
Delay (s)	20.1	2.2	4.4		16.9	16.3
Level of Service	C	A	A		B	B
Approach Delay (s)		2.9	4.4		16.6	
Approach LOS		A	A		B	

Intersection Summary

HCM 2000 Control Delay	4.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
8: Abella Circle East & Road 20

Alternative 1 - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	177	0	0	220	30	61	0	77	39	0	8
Future Volume (vph)	7	177	0	0	220	30	61	0	77	39	0	8
Peak Hour Factor	0.78	0.78	0.78	0.90	0.90	0.90	0.66	0.66	0.66	0.69	0.69	0.69
Hourly flow rate (vph)	9	227	0	0	244	33	92	0	117	57	0	12
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	236	277	209	69								
Volume Left (vph)	9	0	92	57								
Volume Right (vph)	0	33	117	12								
Hadj (s)	0.04	-0.04	-0.21	0.09								
Departure Headway (s)	5.1	5.0	5.1	5.7								
Degree Utilization, x	0.33	0.38	0.30	0.11								
Capacity (veh/h)	659	683	636	556								
Control Delay (s)	10.6	11.0	10.3	9.4								
Approach Delay (s)	10.6	11.0	10.3	9.4								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay			10.6									
Level of Service			B									
Intersection Capacity Utilization			29.4%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
 9: EI Portal Dr/EI Portal Dr. & Road 20/Private Driveway

Alternative 1 - AM Peak  
 01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	↖		↗			↖	↗	↖			↖	↗		
Traffic Volume (vph)	52	0	241	0	0	4	153	627	0	0	570	97		
Future Volume (vph)	52	0	241	0	0	4	153	627	0	0	570	97		
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		1.00			1.00	1.00	1.00			1.00	1.00		
Frbp, ped/bikes	1.00		1.00			1.00	1.00	1.00			1.00	1.00		
Flpb, ped/bikes	1.00		1.00			1.00	1.00	1.00			1.00	1.00		
Frt	1.00		0.85			0.86	1.00	1.00			1.00	0.85		
Flt Protected	0.95		1.00			1.00	0.95	1.00			1.00	1.00		
Satd. Flow (prot)	1770		1583			1315	1752	1845			1845	1568		
Flt Permitted	0.95		1.00			1.00	0.95	1.00			1.00	1.00		
Satd. Flow (perm)	1770		1583			1315	1752	1845			1845	1568		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94		
Adj. Flow (vph)	55	0	256	0	0	4	163	667	0	0	606	103		
RTOR Reduction (vph)	0	0	217	0	0	3	0	0	0	0	0	45		
Lane Group Flow (vph)	55	0	39	0	0	1	163	667	0	0	606	58		
Confl. Peds. (#/hr)							2		3	3		2		
Confl. Bikes (#/hr)									2			1		
Heavy Vehicles (%)	2%	2%	2%	25%	25%	25%	3%	3%	3%	3%	3%	3%		
Turn Type	Prot		Perm			Perm	Prot	NA			NA	Prot		
Protected Phases	4						5				6	6		
Permitted Phases			4			8		2						
Actuated Green, G (s)	8.2		8.2			8.2	6.3	37.0			26.7	26.7		
Effective Green, g (s)	8.2		8.2			8.2	6.3	37.0			26.7	26.7		
Actuated g/C Ratio	0.15		0.15			0.15	0.12	0.70			0.50	0.50		
Clearance Time (s)	4.0		4.0			4.0	4.0	4.0			4.0	4.0		
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	272		243			202	207	1283			925	786		
v/s Ratio Prot	c0.03						c0.09				c0.33	0.04		
v/s Ratio Perm			0.02			0.00		0.36						
v/c Ratio	0.20		0.16			0.00	0.79	0.52			0.66	0.07		
Uniform Delay, d1	19.6		19.5			19.0	22.8	3.9			9.8	6.9		
Progression Factor	1.00		1.00			1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	0.4		0.3			0.0	17.7	1.5			3.6	0.2		
Delay (s)	20.0		19.8			19.0	40.5	5.4			13.4	7.0		
Level of Service	C		B			B	D	A			B	A		
Approach Delay (s)		19.9			19.0			12.3			12.5			
Approach LOS		B			B			B			B			
<b>Intersection Summary</b>														
HCM 2000 Control Delay			13.7									HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio			0.58											
Actuated Cycle Length (s)			53.2								12.0			
Intersection Capacity Utilization			51.8%										ICU Level of Service	A
Analysis Period (min)			15											
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis  
10: Church Ln & El Portal Dr

Alternative 1 - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 									 	
Traffic Volume (vph)	82	470	259	321	556	20	103	126	286	12	270	121
Future Volume (vph)	82	470	259	321	556	20	103	126	286	12	270	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0		4.0	5.0	5.0	3.0	4.0	5.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1758	3244		1770	1863	1583	1770	1863	1583	1770	1721	
Flt Permitted	0.28	1.00		0.12	1.00	1.00	0.19	1.00	1.00	0.66	1.00	
Satd. Flow (perm)	520	3244		218	1863	1583	347	1863	1583	1222	1721	
Peak-hour factor, PHF	0.85	0.92	0.85	0.92	0.92	0.92	0.79	0.79	0.92	0.92	0.85	0.85
Adj. Flow (vph)	96	511	305	349	604	22	130	159	311	13	318	142
RTOR Reduction (vph)	0	70	0	0	0	13	0	0	211	0	12	0
Lane Group Flow (vph)	96	746	0	349	604	9	130	159	100	13	448	0
Confl. Peds. (#/hr)	26		14				29					29
Confl. Bikes (#/hr)												2
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	custom	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		8	8		
Actuated Green, G (s)	39.1	34.0		59.4	50.3	50.3	47.7	42.3	37.5	38.9	37.5	
Effective Green, g (s)	41.1	34.0		59.4	50.3	50.3	48.7	43.3	37.5	38.9	38.5	
Actuated g/C Ratio	0.35	0.29		0.51	0.43	0.43	0.42	0.37	0.32	0.33	0.33	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	247	941		394	800	679	231	688	506	412	565	
v/s Ratio Prot	0.02	0.23		c0.16	0.32		c0.03	0.09		0.00	c0.26	
v/s Ratio Perm	0.12			c0.29		0.01	0.20		0.06	0.01		
v/c Ratio	0.39	0.79		0.89	0.76	0.01	0.56	0.23	0.20	0.03	0.79	
Uniform Delay, d1	26.8	38.3		31.5	28.2	19.2	24.9	25.4	28.9	26.3	35.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	5.6		20.5	5.4	0.0	3.1	0.2	0.3	0.0	7.9	
Delay (s)	27.9	43.9		52.0	33.6	19.2	28.0	25.7	29.1	26.3	43.6	
Level of Service	C	D		D	C	B	C	C	C	C	D	
Approach Delay (s)		42.2			39.8			28.0			43.1	
Approach LOS		D			D			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			38.7								HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			117.1								Sum of lost time (s)	17.0
Intersection Capacity Utilization			81.8%								ICU Level of Service	D
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
1: Giant Road & Parr Boulevard/Road 20

Alternative 1 - PM Peak

01/05/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	170	99	46	2	30	25	16	208	9	11	112	38	
Future Volume (vph)	170	99	46	2	30	25	16	208	9	11	112	38	
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		5.0	5.0		5.0	5.0		
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.95		1.00	0.93		1.00	0.99		1.00	0.96		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1752	1745		1719	1688		1752	1834		1787	1810		
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.62	1.00		
Satd. Flow (perm)	1752	1745		1719	1688		1752	1834		1159	1810		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	179	104	48	2	32	26	17	219	9	12	118	40	
RTOR Reduction (vph)	0	15	0	0	24	0	0	2	0	0	12	0	
Lane Group Flow (vph)	179	137	0	2	34	0	17	226	0	12	146	0	
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	3%	3%	3%	1%	1%	1%	
Turn Type	Split	NA		Split	NA		Prot	NA		Perm	NA		
Protected Phases	4	4		8	8		5	2			6		
Permitted Phases													
Actuated Green, G (s)	11.2	11.2		3.8	3.8		0.9	21.7		15.8	15.8		
Effective Green, g (s)	11.2	11.2		3.8	3.8		0.9	21.7		15.8	15.8		
Actuated g/C Ratio	0.23	0.23		0.08	0.08		0.02	0.44		0.32	0.32		
Clearance Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0		
Vehicle Extension (s)	4.0	4.0		3.0	3.0		2.0	4.0		4.0	4.0		
Lane Grp Cap (vph)	394	393		131	129		31	800		368	575		
v/s Ratio Prot	c0.10	0.08		0.00	c0.02		0.01	c0.12			0.08		
v/s Ratio Perm										0.01			
v/c Ratio	0.45	0.35		0.02	0.26		0.55	0.28		0.03	0.25		
Uniform Delay, d1	16.6	16.2		21.2	21.6		24.2	9.0		11.7	12.6		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	1.1	0.7		0.0	1.1		10.2	0.3		0.0	0.3		
Delay (s)	17.7	16.9		21.3	22.7		34.4	9.3		11.7	12.9		
Level of Service	B	B		C	C		C	A		B	B		
Approach Delay (s)		17.4			22.7			11.0			12.8		
Approach LOS		B			C			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			14.9									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.39										
Actuated Cycle Length (s)			49.7									Sum of lost time (s)	18.0
Intersection Capacity Utilization			36.9%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
2: Rumrill Blvd. & Broadway Ave.

Alternative 1 - PM Peak

01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	24	182	12	190	268	20	29	686	304	15	288	32
Future Volume (vph)	24	182	12	190	268	20	29	686	304	15	288	32
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1859		1760	1840		1784	1787		1787	1848	
Flt Permitted	0.95	1.00		0.37	1.00		0.48	1.00		0.08	1.00	
Satd. Flow (perm)	1787	1859		693	1840		897	1787		153	1848	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	25	188	12	196	276	21	30	707	313	15	297	33
RTOR Reduction (vph)	0	2	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	25	198	0	196	297	0	30	1005	0	15	330	0
Confl. Peds. (#/hr)	4		14	14		4	3		1	1		3
Confl. Bikes (#/hr)			2			4						
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8			2			6		
Actuated Green, G (s)	2.0	17.8		25.8	20.8		52.3	49.9		49.1	48.3	
Effective Green, g (s)	3.0	18.8		27.8	21.8		54.3	51.4		51.1	49.8	
Actuated g/C Ratio	0.03	0.21		0.31	0.24		0.60	0.57		0.57	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	2.0		3.0	2.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	59	388		285	445		574	1020		119	1022	
v/s Ratio Prot	0.01	0.11		c0.05	0.16		c0.00	c0.56		c0.00	0.18	
v/s Ratio Perm				c0.17			0.03			0.07		
v/c Ratio	0.42	0.51		0.69	0.67		0.05	0.99		0.13	0.32	
Uniform Delay, d1	42.7	31.5		26.5	30.8		7.5	18.9		20.0	10.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	4.7		6.7	2.9		0.0	24.5		0.5	0.3	
Delay (s)	47.5	36.2		33.2	33.8		7.6	43.4		20.4	11.2	
Level of Service	D	D		C	C		A	D		C	B	
Approach Delay (s)		37.5			33.6			42.4			11.6	
Approach LOS		D			C			D			B	

Intersection Summary

HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 3: San Pablo Ave. & Broadway Ave./El Portal Dr.

Alternative 1 - PM Peak

01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	384	134	75	274	135	199	875	76	137	491	16
Future Volume (vph)	21	384	134	75	274	135	199	875	76	137	491	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1747	1863	1552	1770	3539	1533	1770	3539	1583	1770	3519	16
Flt Permitted	0.55	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1004	1863	1552	1770	3539	1533	1770	3539	1583	1770	3519	16
Peak-hour factor, PHF	0.88	0.88	0.88	0.80	0.80	0.80	0.90	0.90	0.90	0.89	0.89	0.89
Adj. Flow (vph)	24	436	152	94	342	169	221	972	84	154	552	18
RTOR Reduction (vph)	0	0	111	0	0	104	0	0	29	0	2	0
Lane Group Flow (vph)	24	436	41	94	343	65	221	972	56	154	568	0
Confl. Peds. (#/hr)	16		7	7		16	13					13
Confl. Bikes (#/hr)												5
Turn Type	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases		4		3	8		5	2	3	1	6	
Permitted Phases	4		4			8			2			
Actuated Green, G (s)	28.8	28.8	28.8	8.0	41.3	41.3	16.4	42.0	50.0	12.2	37.8	
Effective Green, g (s)	29.8	29.8	29.8	9.5	42.3	42.3	17.9	45.0	53.0	13.7	40.8	
Actuated g/C Ratio	0.27	0.27	0.27	0.09	0.38	0.38	0.16	0.41	0.48	0.12	0.37	
Clearance Time (s)	4.0	4.0	4.0	4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.0	2.5	2.5	2.0	5.0	2.0	2.0	5.0	
Lane Grp Cap (vph)	271	504	420	152	1360	589	288	1447	762	220	1305	
v/s Ratio Prot		c0.23		c0.05	0.10		c0.12	c0.27	0.01	0.09	0.16	
v/s Ratio Perm	0.02		0.03			0.04			0.03			
v/c Ratio	0.09	0.87	0.10	0.62	0.25	0.11	0.77	0.67	0.07	0.70	0.44	
Uniform Delay, d1	30.0	38.2	30.0	48.5	23.1	21.8	44.1	26.5	15.3	46.2	26.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.31	1.00	1.06	1.39	0.78	
Incremental Delay, d2	0.1	14.2	0.1	5.2	0.1	0.1	9.0	2.1	0.0	6.9	1.0	
Delay (s)	30.1	52.4	30.1	53.7	23.1	21.8	66.8	28.6	16.2	70.9	21.2	
Level of Service	C	D	C	D	C	C	E	C	B	E	C	
Approach Delay (s)		46.0			27.5			34.4			31.8	
Approach LOS		D			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			34.7									C
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			110.0								12.0	
Intersection Capacity Utilization			71.9%									C
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis  
4: Mission Bell Dr & El Portal Dr.

Alternative 1 - PM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	386	80	22	358	35	0	0	45	57	14	23
Future Volume (Veh/h)	20	386	80	22	358	35	0	0	45	57	14	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	420	87	24	389	38	0	0	49	62	15	25
Pedestrians		1						2				
Lane Width (ft)		12.0						12.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		264										
pX, platoon unblocked				0.79			0.79	0.79	0.79	0.79	0.79	
vC, conflicting volume	427			509			980	984	466	920	1009	409
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	427			250			844	850	195	768	881	409
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			98			100	100	93	72	93	96
cM capacity (veh/h)	1127			1046			198	227	674	220	211	627
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	22	507	24	427	49	62	40					
Volume Left	22	0	24	0	0	62	0					
Volume Right	0	87	0	38	49	0	25					
cSH	1127	1700	1046	1700	674	220	360					
Volume to Capacity	0.02	0.30	0.02	0.25	0.07	0.28	0.11					
Queue Length 95th (ft)	1	0	2	0	6	28	9					
Control Delay (s)	8.3	0.0	8.5	0.0	10.8	27.6	16.2					
Lane LOS	A		A		B	D	C					
Approach Delay (s)	0.3		0.5		10.8	23.2						
Approach LOS					B	C						
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
5: San Pablo Ave. & 23rd St./Road 20

Alternative 1 - PM Peak  
01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	454	92	87	17	91	40	99	528	32	44	279	357
Future Volume (vph)	454	92	87	17	91	40	99	528	32	44	279	357
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96		1.00	1.00	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1730	1542		1848	1583	1770	3498		1770	3539	1555
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1698	1730	1542		1848	1583	1770	3498		1770	3539	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	468	95	90	18	94	41	102	544	33	45	288	368
RTOR Reduction (vph)	0	0	47	0	0	36	0	2	0	0	0	196
Lane Group Flow (vph)	281	282	43	0	112	5	102	575	0	45	288	172
Confl. Peds. (#/hr)			15	15			8		12	12		8
Confl. Bikes (#/hr)			2						1			1
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA	pm+ov	Split	NA	Perm	Prot	NA		Prot	NA	pm+ov
Protected Phases	4	4	5	8	8		5	2		1	6	4
Permitted Phases			4			8						6
Actuated Green, G (s)	26.5	26.5	38.9		13.8	13.8	12.4	31.5		6.4	25.5	52.0
Effective Green, g (s)	26.5	26.5	38.9		13.8	13.8	12.4	31.5		6.4	25.5	52.0
Actuated g/C Ratio	0.24	0.24	0.35		0.12	0.12	0.11	0.28		0.06	0.23	0.47
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	5.0		2.0	5.0	2.0
Lane Grp Cap (vph)	405	413	540		229	196	197	992		102	813	728
v/s Ratio Prot	c0.17	0.16	0.01		c0.06		c0.06	c0.16		0.03	0.08	0.06
v/s Ratio Perm			0.02			0.00						0.05
v/c Ratio	0.69	0.68	0.08		0.49	0.03	0.52	0.58		0.44	0.35	0.24
Uniform Delay, d1	38.5	38.4	24.1		45.3	42.7	46.5	34.1		50.6	35.8	17.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.1	3.7	0.0		1.6	0.1	1.0	1.3		1.1	0.6	0.1
Delay (s)	42.7	42.1	24.1		47.0	42.7	47.4	35.4		51.7	36.4	17.7
Level of Service	D	D	C		D	D	D	D		D	D	B
Approach Delay (s)		39.9			45.8			37.2			27.6	
Approach LOS		D			D			D			C	

Intersection Summary

HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	111.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
6: Road 20 & Paseo Way

Alternative 1 - PM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	222	204	9	7	16
Future Volume (Veh/h)	10	222	204	9	7	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.48	0.48	0.72	0.72
Hourly flow rate (vph)	14	304	425	19	10	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		650	715			
pX, platoon unblocked						
vC, conflicting volume	444				766	434
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	444				766	434
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	96
cM capacity (veh/h)	1116				366	622
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	318	444	32			
Volume Left	14	0	10			
Volume Right	0	19	22			
cSH	1116	1700	510			
Volume to Capacity	0.01	0.26	0.06			
Queue Length 95th (ft)	1	0	5			
Control Delay (s)	0.5	0.0	12.5			
Lane LOS	A		B			
Approach Delay (s)	0.5	0.0	12.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			29.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis  
7: Road 20 & Abella Circle West

Alternative 1 - PM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	269	191	27	15	25
Future Volume (vph)	11	269	191	27	15	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1832		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1832		1770	1583
Peak-hour factor, PHF	0.72	0.72	0.53	0.53	0.77	0.77
Adj. Flow (vph)	15	374	360	51	19	32
RTOR Reduction (vph)	0	0	4	0	0	30
Lane Group Flow (vph)	15	374	407	0	19	2
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases						8
Actuated Green, G (s)	0.9	29.0	24.1		2.0	2.0
Effective Green, g (s)	0.9	29.0	24.1		2.0	2.0
Actuated g/C Ratio	0.02	0.74	0.62		0.05	0.05
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	4.0	4.0		2.0	2.0
Lane Grp Cap (vph)	40	1385	1132		90	81
v/s Ratio Prot	0.01	c0.20	c0.22		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.38	0.27	0.36		0.21	0.02
Uniform Delay, d1	18.8	1.6	3.7		17.7	17.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.1	0.1	0.3		0.4	0.0
Delay (s)	20.9	1.7	3.9		18.2	17.6
Level of Service	C	A	A		B	B
Approach Delay (s)		2.5	3.9		17.8	
Approach LOS		A	A		B	

Intersection Summary

HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
8: Abella Circle East & Road 20

Alternative 1 - PM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	14	179	0	0	188	34	32	0	45	23	0	11
Future Volume (vph)	14	179	0	0	188	34	32	0	45	23	0	11
Peak Hour Factor	0.64	0.64	0.64	0.78	0.78	0.78	0.36	0.36	0.36	0.80	0.80	0.80
Hourly flow rate (vph)	22	280	0	0	241	44	89	0	125	29	0	14
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	302	285	214	43								
Volume Left (vph)	22	0	89	29								
Volume Right (vph)	0	44	125	14								
Hadj (s)	0.05	-0.06	-0.23	-0.03								
Departure Headway (s)	5.1	5.0	5.2	5.8								
Degree Utilization, x	0.42	0.39	0.31	0.07								
Capacity (veh/h)	670	682	622	532								
Control Delay (s)	11.8	11.2	10.6	9.2								
Approach Delay (s)	11.8	11.2	10.6	9.2								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay			11.1									
Level of Service			B									
Intersection Capacity Utilization			32.3%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
 9: EI Portal Dr/EI Portal Dr. & Road 20/Private Driveway

Alternative 1 - PM Peak

01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖			↖	↖	↖			↖	↖
Traffic Volume (vph)	52	0	195	0	0	3	163	582	0	0	701	59
Future Volume (vph)	52	0	195	0	0	3	163	582	0	0	701	59
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		1.00			1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00		0.98			1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00			1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85			0.86	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1736		1520			1644	1770	1863			1881	1599
Flt Permitted	0.95		1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1736		1520			1644	1770	1863			1881	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	54	0	203	0	0	3	170	606	0	0	730	61
RTOR Reduction (vph)	0	0	174	0	0	3	0	0	0	0	0	34
Lane Group Flow (vph)	54	0	29	0	0	0	170	606	0	0	730	27
Confl. Peds. (#/hr)			10	10			8		6	6		8
Confl. Bikes (#/hr)									4			1
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Turn Type	Prot		Perm			Perm	Prot	NA			NA	Prot
Protected Phases	4						5				6	6
Permitted Phases			4			8		2				
Actuated Green, G (s)	7.4		7.4			7.4	9.0	36.0			23.0	23.0
Effective Green, g (s)	7.4		7.4			7.4	9.0	36.0			23.0	23.0
Actuated g/C Ratio	0.14		0.14			0.14	0.18	0.70			0.45	0.45
Clearance Time (s)	4.0		4.0			4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	249		218			236	309	1304			841	715
v/s Ratio Prot	c0.03						c0.10				c0.39	0.02
v/s Ratio Perm			0.02			0.00		0.33				
v/c Ratio	0.22		0.13			0.00	0.55	0.46			0.87	0.04
Uniform Delay, d1	19.4		19.2			18.8	19.4	3.4			12.8	8.0
Progression Factor	1.00		1.00			1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4		0.3			0.0	6.9	1.2			11.8	0.1
Delay (s)	19.9		19.5			18.8	26.2	4.6			24.6	8.1
Level of Service	B		B			B	C	A			C	A
Approach Delay (s)		19.6			18.8			9.4			23.3	
Approach LOS		B			B			A			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			16.8								B	
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			51.4						12.0			
Intersection Capacity Utilization			59.3%								B	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
10: Church Ln & El Portal Dr

Alternative 1 - PM Peak

01/05/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	115	593	188	273	532	21	128	199	308	19	137	85	
Future Volume (vph)	115	593	188	273	532	21	128	199	308	19	137	85	
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	5.0	5.0	5.0	5.0		
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.93	1.00	1.00	0.99	1.00	0.98		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1770	3387		1770	1863	1474	1762	1863	1563	1770	1716		
Flt Permitted	0.22	1.00		0.13	1.00	1.00	0.30	1.00	1.00	0.63	1.00		
Satd. Flow (perm)	406	3387		245	1863	1474	556	1863	1563	1174	1716		
Peak-hour factor, PHF	0.91	0.91	0.91	0.88	0.88	0.88	0.98	0.98	0.98	0.80	0.80	0.80	
Adj. Flow (vph)	126	652	207	310	605	24	131	203	314	24	171	106	
RTOR Reduction (vph)	0	24	0	0	0	14	0	0	240	0	18	0	
Lane Group Flow (vph)	126	835	0	310	605	10	131	203	74	24	259	0	
Confl. Peds. (#/hr)	13		2	2		13	14					14	
Confl. Bikes (#/hr)			2						1			3	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	custom	pm+pt	NA		
Protected Phases	5	2		1	6		7	4		3	8		
Permitted Phases	2			6		6	4		8	8			
Actuated Green, G (s)	43.3	35.2		57.5	44.4	44.4	39.7	32.6	25.3	27.4	25.3		
Effective Green, g (s)	43.3	35.2		57.5	44.4	44.4	39.7	32.6	25.3	27.4	25.3		
Actuated g/C Ratio	0.40	0.33		0.54	0.41	0.41	0.37	0.30	0.24	0.26	0.24		
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	2.0	6.0		2.5	6.0	6.0	2.0	4.0	4.0	2.5	4.0		
Lane Grp Cap (vph)	267	1112		377	771	610	311	566	368	311	404		
v/s Ratio Prot	0.04	0.25		c0.13	0.32		c0.04	0.11		0.00	c0.15		
v/s Ratio Perm	0.15			c0.31		0.01	0.12		0.05	0.02			
v/c Ratio	0.47	0.75		0.82	0.78	0.02	0.42	0.36	0.20	0.08	0.64		
Uniform Delay, d1	22.2	32.1		23.9	27.3	18.5	24.1	29.1	32.8	30.1	36.9		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.5	3.8		13.2	6.5	0.0	0.3	0.5	0.4	0.1	3.9		
Delay (s)	22.7	35.9		37.1	33.8	18.6	24.5	29.7	33.2	30.2	40.7		
Level of Service	C	D		D	C	B	C	C	C	C	D		
Approach Delay (s)		34.2			34.5			30.3			39.9		
Approach LOS		C			C			C			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			34.0									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.76										
Actuated Cycle Length (s)			107.2									Sum of lost time (s)	20.0
Intersection Capacity Utilization			76.0%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
1: Giant Road & Parr Boulevard/Road 20

Alternative 2 - AM Peak

01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	23	30	3	54	20	35	89	1	10	85	67
Future Volume (vph)	35	23	30	3	54	20	35	89	1	10	85	67
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		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.96		1.00	1.00		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1456	1401		1787	1791		1719	1807		1703	1674	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.69	1.00	
Satd. Flow (perm)	1456	1401		1787	1791		1719	1807		1245	1674	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	37	24	32	3	57	21	37	95	1	11	90	71
RTOR Reduction (vph)	0	29	0	0	17	0	0	0	0	0	23	0
Lane Group Flow (vph)	37	27	0	3	61	0	37	96	0	11	138	0
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	24%	24%	24%	1%	1%	1%	5%	5%	5%	6%	6%	6%
Turn Type	Split	NA		Split	NA		Prot	NA		Perm	NA	
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)	4.4	4.4		4.2	4.2		2.1	29.2		22.1	22.1	
Effective Green, g (s)	4.4	4.4		4.2	4.2		2.1	29.2		22.1	22.1	
Actuated g/C Ratio	0.09	0.09		0.08	0.08		0.04	0.57		0.44	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0		3.0	3.0		2.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	126	121		147	148		71	1038		541	728	
v/s Ratio Prot	c0.03	0.02		0.00	c0.03		c0.02	0.05			c0.08	
v/s Ratio Perm										0.01		
v/c Ratio	0.29	0.22		0.02	0.41		0.52	0.09		0.02	0.19	
Uniform Delay, d1	21.7	21.6		21.4	22.1		23.9	4.8		8.2	8.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	1.3		0.1	1.8		3.2	0.1		0.0	0.2	
Delay (s)	23.5	22.9		21.5	24.0		27.0	4.9		8.2	9.0	
Level of Service	C	C		C	C		C	A		A	A	
Approach Delay (s)		23.1			23.9			11.1			9.0	
Approach LOS		C			C			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			14.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			50.8			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			45.2%			ICU Level of Service			A			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: Rumrill Blvd. & Broadway Ave.

Alternative 2 - AM Peak

01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	10	224	6	137	130	9	10	238	188	8	255	8
Future Volume (vph)	10	224	6	137	130	9	10	238	188	8	255	8
Ideal Flow (vphp)	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	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.93		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1853		1746	1824		1717	1680		1719	1799	
Flt Permitted	0.95	1.00		0.46	1.00		0.41	1.00		0.20	1.00	
Satd. Flow (perm)	1770	1853		848	1824		746	1680		361	1799	
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)	11	243	7	149	141	10	11	259	204	9	277	9
RTOR Reduction (vph)	0	1	0	0	0	0	0	30	0	0	0	0
Lane Group Flow (vph)	11	249	0	149	151	0	11	433	0	9	286	0
Confl. Peds. (#/hr)	5		9	9		5	3		1	1		3
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8			2			6		
Actuated Green, G (s)	1.2	34.2		49.2	44.0		29.1	27.9		27.5	27.1	
Effective Green, g (s)	1.2	34.2		49.2	44.0		29.1	27.9		27.5	27.1	
Actuated g/C Ratio	0.01	0.38		0.55	0.49		0.32	0.31		0.31	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	23	704		573	891		254	520		116	541	
v/s Ratio Prot	0.01	c0.13		c0.03	0.08		c0.00	c0.26		0.00	0.16	
v/s Ratio Perm				0.11			0.01			0.02		
v/c Ratio	0.48	0.35		0.26	0.17		0.04	0.83		0.08	0.53	
Uniform Delay, d1	44.1	20.0		10.6	12.8		21.1	28.9		23.3	26.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.6	1.4		0.1	0.0		0.0	11.4		0.1	1.2	
Delay (s)	49.7	21.4		10.7	12.9		21.1	40.3		23.4	27.4	
Level of Service	D	C		B	B		C	D		C	C	
Approach Delay (s)		22.6			11.8			39.9			27.2	
Approach LOS		C			B			D			C	

Intersection Summary		
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.52	C
Actuated Cycle Length (s)	90.0	Sum of lost time (s)
Intersection Capacity Utilization	63.7%	16.5
Analysis Period (min)	15	ICU Level of Service
		B
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis  
3: San Pablo Ave. & Broadway Ave./El Portal Dr.

Alternative 2 - AM Peak

01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	530	110	78	285	79	140	352	104	206	673	18
Future Volume (vph)	21	530	110	78	285	79	140	352	104	206	673	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1758	3436		1770	1863	1545	1770	3539	1561	1770	3523	
Flt Permitted	0.50	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	920	3436		1770	1863	1545	1770	3539	1561	1770	3523	
Peak-hour factor, PHF	0.81	0.81	0.81	0.68	0.68	0.68	0.91	0.91	0.91	0.79	0.79	0.79
Adj. Flow (vph)	26	654	136	115	419	116	154	387	114	261	852	23
RTOR Reduction (vph)	0	18	0	0	0	48	0	0	43	0	2	0
Lane Group Flow (vph)	26	772	0	115	419	68	154	387	71	261	873	0
Confl. Peds. (#/hr)	9		8	8		9	11		5	5		11
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases		4		3	8		5	2	3	1	6	
Permitted Phases	4					8			2			
Actuated Green, G (s)	26.6	26.6		9.2	40.3	40.3	12.7	30.5	39.7	16.7	34.5	
Effective Green, g (s)	26.6	26.6		9.2	40.3	40.3	12.7	30.5	39.7	16.7	34.5	
Actuated g/C Ratio	0.26	0.26		0.09	0.40	0.40	0.12	0.30	0.39	0.16	0.34	
Clearance Time (s)	4.0	4.0		4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	
Vehicle Extension (s)	2.5	2.5		2.0	2.5	2.5	2.0	6.0	2.0	2.0	6.0	
Lane Grp Cap (vph)	239	896		159	736	610	220	1058	607	289	1191	
v/s Ratio Prot		c0.22		c0.06	0.22		0.09	0.11	0.01	c0.15	c0.25	
v/s Ratio Perm	0.03					0.04			0.03			
v/c Ratio	0.11	0.86		0.72	0.57	0.11	0.70	0.37	0.12	0.90	0.73	
Uniform Delay, d1	28.7	35.9		45.2	24.1	19.5	42.8	28.1	19.9	41.9	29.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.25	1.45	0.96	1.49	0.66	
Incremental Delay, d2	0.1	8.5		12.9	0.8	0.1	7.2	0.9	0.0	26.3	3.6	
Delay (s)	28.8	44.4		58.0	24.9	19.6	60.8	41.6	19.2	88.6	23.2	
Level of Service	C	D		E	C	B	E	D	B	F	C	
Approach Delay (s)		43.9			29.8			42.2			38.2	
Approach LOS		D			C			D			D	

Intersection Summary

HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	102.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
4: Mission Bell Dr & El Portal Dr.

Alternative 2 - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	291	71	29	230	23	0	0	43	42	15	17
Future Volume (Veh/h)	24	291	71	29	230	23	0	0	43	42	15	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	300	73	30	237	24	0	0	44	43	15	18
Pedestrians		2			2			5			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		264										
pX, platoon unblocked												
vC, conflicting volume	262			378			716	714	194	512	738	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262			378			716	714	194	512	738	252
tC, single (s)	4.2			4.2			7.5	6.5	6.9	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			97			100	100	95	89	95	97
cM capacity (veh/h)	1277			1158			289	342	817	386	311	719
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	175	223	30	261	44	43	33					
Volume Left	25	0	30	0	0	43	0					
Volume Right	0	73	0	24	44	0	18					
cSH	1277	1700	1158	1700	817	386	450					
Volume to Capacity	0.02	0.13	0.03	0.15	0.05	0.11	0.07					
Queue Length 95th (ft)	1	0	2	0	4	9	6					
Control Delay (s)	1.3	0.0	8.2	0.0	9.7	15.5	13.6					
Lane LOS	A		A		A	C	B					
Approach Delay (s)	0.6		0.8		9.7	14.7						
Approach LOS					A	B						
<b>Intersection Summary</b>												
Average Delay			2.5									
Intersection Capacity Utilization			38.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
5: San Pablo Ave. & 23rd St./Road 20

Alternative 2 - AM Peak  
01/05/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	195	52	59	21	56	25	58	167	16	23	281	251	
Future Volume (vph)	195	52	59	21	56	25	58	167	16	23	281	251	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85	
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1681	1720	1551		1820	1568	1719	3381		1736	3471	1527	
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	1681	1720	1551		1820	1568	1719	3381		1736	3471	1527	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	203	54	61	22	58	26	60	174	17	24	293	261	
RTOR Reduction (vph)	0	0	39	0	0	23	0	3	0	0	0	128	
Lane Group Flow (vph)	128	129	22	0	80	3	60	188	0	24	293	133	
Confl. Peds. (#/hr)			5	5			9		7	7		9	
Confl. Bikes (#/hr)									2				
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	5%	5%	5%	4%	4%	4%	
Turn Type	Split	NA	pm+ov	Split	NA	Perm	Prot	NA		Prot	NA	pm+ov	
Protected Phases	4	4	5	8	8		5	2		1	6	4	
Permitted Phases			4			8						6	
Actuated Green, G (s)	22.2	22.2	30.0		10.0	10.0	7.8	26.4		2.5	21.1	43.3	
Effective Green, g (s)	22.2	22.2	30.0		10.0	10.0	7.8	26.4		2.5	21.1	43.3	
Actuated g/C Ratio	0.26	0.26	0.35		0.12	0.12	0.09	0.31		0.03	0.25	0.51	
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	6.0		2.0	6.0	2.0	
Lane Grp Cap (vph)	438	448	546		213	184	157	1048		50	860	884	
v/s Ratio Prot	c0.08	0.08	0.00		c0.04		c0.03	c0.06		0.01	c0.08	0.04	
v/s Ratio Perm			0.01			0.00						0.05	
v/c Ratio	0.29	0.29	0.04		0.38	0.02	0.38	0.18		0.48	0.34	0.15	
Uniform Delay, d1	25.2	25.1	18.1		34.7	33.2	36.4	21.4		40.7	26.3	11.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.1	0.0		1.1	0.0	0.6	0.2		2.6	0.7	0.0	
Delay (s)	25.3	25.3	18.1		35.8	33.2	36.9	21.7		43.3	27.0	11.1	
Level of Service	C	C	B		D	C	D	C		D	C	B	
Approach Delay (s)		23.9			35.2			25.3			20.5		
Approach LOS		C			D			C			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			23.6									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.37										
Actuated Cycle Length (s)			85.1									Sum of lost time (s)	30.0
Intersection Capacity Utilization			43.0%									ICU Level of Service	A
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
6: Road 20 & Paseo Way

Alternative 2 - AM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↘	
Traffic Volume (veh/h)	13	279	248	11	12	21
Future Volume (Veh/h)	13	279	248	11	12	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.79	0.79	0.92	0.92
Hourly flow rate (vph)	18	388	314	14	13	23
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		644	715			
<b>pX, platoon unblocked</b>						
vC, conflicting volume	328			745	321	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	328			745	321	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	99			97	97	
cM capacity (veh/h)	1232			376	720	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	406	328	36			
Volume Left	18	0	13			
Volume Right	0	14	23			
cSH	1232	1700	541			
Volume to Capacity	0.01	0.19	0.07			
Queue Length 95th (ft)	1	0	5			
Control Delay (s)	0.5	0.0	12.1			
Lane LOS	A		B			
Approach Delay (s)	0.5	0.0	12.1			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			0.8			
Intersection Capacity Utilization			35.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis  
7: Road 20 & Abella Circle West

Alternative 2 - AM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	269	228	17	25	22
Future Volume (vph)	11	269	228	17	25	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1845		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1845		1770	1583
Peak-hour factor, PHF	0.74	0.74	0.73	0.73	0.78	0.78
Adj. Flow (vph)	15	364	312	23	32	28
RTOR Reduction (vph)	0	0	3	0	0	26
Lane Group Flow (vph)	15	364	332	0	32	2
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases						8
Actuated Green, G (s)	1.0	27.5	22.5		3.2	3.2
Effective Green, g (s)	1.0	27.5	22.5		3.2	3.2
Actuated g/C Ratio	0.03	0.71	0.58		0.08	0.08
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	4.0	4.0		2.0	2.0
Lane Grp Cap (vph)	45	1323	1072		146	130
v/s Ratio Prot	0.01	c0.20	c0.18		c0.02	
v/s Ratio Perm						0.00
v/c Ratio	0.33	0.28	0.31		0.22	0.02
Uniform Delay, d1	18.5	2.0	4.1		16.6	16.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.2	0.2		0.3	0.0
Delay (s)	20.1	2.2	4.4		16.9	16.3
Level of Service	C	A	A		B	B
Approach Delay (s)		2.9	4.4		16.6	
Approach LOS		A	A		B	

Intersection Summary

HCM 2000 Control Delay	4.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
8: Abella Circle East & Road 20

Alternative 2 - AM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	177	0	0	220	30	61	0	77	39	0	8
Future Volume (vph)	7	177	0	0	220	30	61	0	77	39	0	8
Peak Hour Factor	0.78	0.78	0.78	0.90	0.90	0.90	0.66	0.66	0.66	0.69	0.69	0.69
Hourly flow rate (vph)	9	227	0	0	244	33	92	0	117	57	0	12
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	236	277	209	69								
Volume Left (vph)	9	0	92	57								
Volume Right (vph)	0	33	117	12								
Hadj (s)	0.04	-0.04	-0.21	0.09								
Departure Headway (s)	5.1	5.0	5.1	5.7								
Degree Utilization, x	0.33	0.38	0.30	0.11								
Capacity (veh/h)	659	683	636	556								
Control Delay (s)	10.6	11.0	10.3	9.4								
Approach Delay (s)	10.6	11.0	10.3	9.4								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay			10.6									
Level of Service			B									
Intersection Capacity Utilization			29.4%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
 9: EI Portal Dr/EI Portal Dr. & Road 20/Private Driveway

Alternative 2 - AM Peak

01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↗			↖	↗	↕			↕	↖
Traffic Volume (vph)	52	0	241	0	0	4	153	627	0	0	570	97
Future Volume (vph)	52	0	241	0	0	4	153	627	0	0	570	97
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		1.00			1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00		1.00			1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00			1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85			0.86	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		1583			1315	1752	3505			3505	1568
Flt Permitted	0.95		1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		1583			1315	1752	3505			3505	1568
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	55	0	256	0	0	4	163	667	0	0	606	103
RTOR Reduction (vph)	0	0	216	0	0	3	0	0	0	0	0	63
Lane Group Flow (vph)	55	0	40	0	0	1	163	667	0	0	606	40
Confl. Peds. (#/hr)							2		3	3		2
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	2%	2%	2%	25%	25%	25%	3%	3%	3%	3%	3%	3%
Turn Type	Prot		Perm			Perm	Prot	NA			NA	Prot
Protected Phases	4						5				6	6
Permitted Phases			4			8		2				
Actuated Green, G (s)	8.2		8.2			8.2	16.1	36.2			16.1	16.1
Effective Green, g (s)	8.2		8.2			8.2	16.1	36.2			16.1	16.1
Actuated g/C Ratio	0.16		0.16			0.16	0.31	0.69			0.31	0.31
Clearance Time (s)	4.0		4.0			4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	276		247			205	538	2421			1076	481
v/s Ratio Prot	c0.03						c0.09				c0.17	0.03
v/s Ratio Perm			0.03			0.00		0.19				
v/c Ratio	0.20		0.16			0.00	0.30	0.28			0.56	0.08
Uniform Delay, d1	19.2		19.1			18.7	13.9	3.1			15.2	12.9
Progression Factor	1.00		1.00			1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4		0.3			0.0	1.4	0.3			2.1	0.3
Delay (s)	19.6		19.4			18.7	15.3	3.4			17.3	13.2
Level of Service	B		B			B	B	A			B	B
Approach Delay (s)		19.5			18.7			5.7			16.7	
Approach LOS		B			B			A			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.3									B
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			52.4							12.0		
Intersection Capacity Utilization			37.6%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
10: Church Ln & El Portal Dr

Alternative 2 - AM Peak

01/05/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 									 		
Traffic Volume (vph)	82	470	259	321	556	20	103	126	286	12	270	121	
Future Volume (vph)	82	470	259	321	556	20	103	126	286	12	270	121	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.0		5.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0		
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1770	3241		1770	1863	1583	1770	1863	1583	1770	1742		
Flt Permitted	0.24	1.00		0.11	1.00	1.00	0.13	1.00	1.00	0.66	1.00		
Satd. Flow (perm)	453	3241		198	1863	1583	241	1863	1583	1222	1742		
Peak-hour factor, PHF	0.85	0.92	0.85	0.92	0.92	0.92	0.79	0.79	0.92	0.92	0.85	0.85	
Adj. Flow (vph)	96	511	305	349	604	22	130	159	311	13	318	142	
RTOR Reduction (vph)	0	69	0	0	0	13	0	0	194	0	12	0	
Lane Group Flow (vph)	96	747	0	349	604	9	130	159	117	13	448	0	
Confl. Peds. (#/hr)	26		14				29					29	
Confl. Bikes (#/hr)												2	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	5	2		1	6		7	4		3	8		
Permitted Phases	2			6		6	4		4	8			
Actuated Green, G (s)	36.6	32.6		58.6	49.6	49.6	54.0	46.0	46.0	38.1	35.1		
Effective Green, g (s)	38.6	32.6		58.6	49.6	49.6	55.0	47.0	46.0	38.1	36.1		
Actuated g/C Ratio	0.31	0.27		0.48	0.40	0.40	0.45	0.38	0.38	0.31	0.29		
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	2.0	6.0		2.5	6.0	6.0	4.0	4.0	4.0	4.0	4.0		
Lane Grp Cap (vph)	196	861		363	753	640	293	714	593	393	512		
v/s Ratio Prot	0.02	0.23		c0.16	0.32		c0.05	0.09		0.00	c0.26		
v/s Ratio Perm	0.13			c0.29		0.01	0.14		0.07	0.01			
v/c Ratio	0.49	0.87		0.96	0.80	0.01	0.44	0.22	0.20	0.03	0.88		
Uniform Delay, d1	31.4	42.9		36.6	32.2	21.9	24.3	25.5	25.8	29.3	41.1		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.7	10.4		37.0	7.3	0.0	1.5	0.2	0.2	0.0	15.7		
Delay (s)	32.2	53.3		73.6	39.5	21.9	25.8	25.7	26.1	29.4	56.8		
Level of Service	C	D		E	D	C	C	C	C	C	E		
Approach Delay (s)		51.1			51.3			25.9			56.1		
Approach LOS		D			D			C			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			46.9									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.89										
Actuated Cycle Length (s)			122.6									Sum of lost time (s)	19.0
Intersection Capacity Utilization			82.7%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
1: Giant Road & Parr Boulevard/Road 20

Alternative 2 - PM Peak

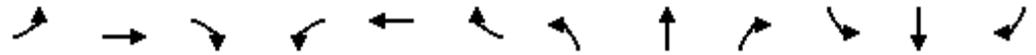
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	99	46	2	30	25	16	208	9	11	112	38
Future Volume (vph)	170	99	46	2	30	25	16	208	9	11	112	38
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		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1745		1719	1688		1752	1834		1787	1810	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.62	1.00	
Satd. Flow (perm)	1752	1745		1719	1688		1752	1834		1159	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	104	48	2	32	26	17	219	9	12	118	40
RTOR Reduction (vph)	0	15	0	0	24	0	0	2	0	0	12	0
Lane Group Flow (vph)	179	137	0	2	34	0	17	226	0	12	146	0
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	3%	3%	3%	1%	1%	1%
Turn Type	Split	NA		Split	NA		Prot	NA		Perm	NA	
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)	11.2	11.2		3.8	3.8		0.9	21.7		15.8	15.8	
Effective Green, g (s)	11.2	11.2		3.8	3.8		0.9	21.7		15.8	15.8	
Actuated g/C Ratio	0.23	0.23		0.08	0.08		0.02	0.44		0.32	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0		3.0	3.0		2.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	394	393		131	129		31	800		368	575	
v/s Ratio Prot	c0.10	0.08		0.00	c0.02		0.01	c0.12			0.08	
v/s Ratio Perm										0.01		
v/c Ratio	0.45	0.35		0.02	0.26		0.55	0.28		0.03	0.25	
Uniform Delay, d1	16.6	16.2		21.2	21.6		24.2	9.0		11.7	12.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.7		0.0	1.1		10.2	0.3		0.0	0.3	
Delay (s)	17.7	16.9		21.3	22.7		34.4	9.3		11.7	12.9	
Level of Service	B	B		C	C		C	A		B	B	
Approach Delay (s)		17.4			22.7			11.0			12.8	
Approach LOS		B			C			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			14.9									B
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			49.7							18.0		
Intersection Capacity Utilization			36.9%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
2: Rumrill Blvd. & Broadway Ave.

Alternative 2 - PM Peak

01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	182	12	190	268	20	29	686	304	15	288	32
Future Volume (vph)	24	182	12	190	268	20	29	686	304	15	288	32
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1859		1760	1840		1784	1787		1787	1848	
Flt Permitted	0.95	1.00		0.37	1.00		0.48	1.00		0.08	1.00	
Satd. Flow (perm)	1787	1859		693	1840		897	1787		153	1848	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	25	188	12	196	276	21	30	707	313	15	297	33
RTOR Reduction (vph)	0	2	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	25	198	0	196	297	0	30	1005	0	15	330	0
Confl. Peds. (#/hr)	4		14	14		4	3		1	1		3
Confl. Bikes (#/hr)			2			4						
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8			2			6		
Actuated Green, G (s)	2.0	17.8		25.8	20.8		52.3	49.9		49.1	48.3	
Effective Green, g (s)	3.0	18.8		27.8	21.8		54.3	51.4		51.1	49.8	
Actuated g/C Ratio	0.03	0.21		0.31	0.24		0.60	0.57		0.57	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	2.0		3.0	2.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	59	388		285	445		574	1020		119	1022	
v/s Ratio Prot	0.01	0.11		c0.05	0.16		c0.00	c0.56		c0.00	0.18	
v/s Ratio Perm				c0.17			0.03			0.07		
v/c Ratio	0.42	0.51		0.69	0.67		0.05	0.99		0.13	0.32	
Uniform Delay, d1	42.7	31.5		26.5	30.8		7.5	18.9		20.0	10.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	4.7		6.7	2.9		0.0	24.5		0.5	0.3	
Delay (s)	47.5	36.2		33.2	33.8		7.6	43.4		20.4	11.2	
Level of Service	D	D		C	C		A	D		C	B	
Approach Delay (s)		37.5			33.6			42.4			11.6	
Approach LOS		D			C			D			B	

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
3: San Pablo Ave. & Broadway Ave./EI Portal Dr.

Alternative 2 - PM Peak

01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗	↗	↖	↗	
Traffic Volume (vph)	21	384	134	75	274	135	199	875	76	137	491	16
Future Volume (vph)	21	384	134	75	274	135	199	875	76	137	491	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1747	3384		1770	3539	1533	1770	3539	1583	1770	3519	
Flt Permitted	0.55	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1004	3384		1770	3539	1533	1770	3539	1583	1770	3519	
Peak-hour factor, PHF	0.88	0.88	0.88	0.80	0.80	0.80	0.90	0.90	0.90	0.89	0.89	0.89
Adj. Flow (vph)	24	436	152	94	342	169	221	972	84	154	552	18
RTOR Reduction (vph)	0	34	0	0	0	110	0	0	26	0	2	0
Lane Group Flow (vph)	24	554	0	94	343	59	221	972	58	154	568	0
Confl. Peds. (#/hr)	16		7	7		16	13					13
Confl. Bikes (#/hr)												5
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases		4		3	8		5	2	3	1	6	
Permitted Phases	4					8			2			
Actuated Green, G (s)	23.4	23.4		9.3	37.2	37.2	17.6	45.8	55.1	12.5	40.7	
Effective Green, g (s)	24.4	24.4		10.8	38.2	38.2	19.1	48.8	58.1	14.0	43.7	
Actuated g/C Ratio	0.22	0.22		0.10	0.35	0.35	0.17	0.44	0.53	0.13	0.40	
Clearance Time (s)	4.0	4.0		4.5	4.0	4.0	4.5	6.0	4.5	4.5	6.0	
Vehicle Extension (s)	2.5	2.5		2.0	2.5	2.5	2.0	5.0	2.0	2.0	5.0	
Lane Grp Cap (vph)	222	750		173	1228	532	307	1570	836	225	1398	
v/s Ratio Prot		c0.16		c0.05	0.10		c0.12	c0.27	0.01	0.09	0.16	
v/s Ratio Perm	0.02					0.04			0.03			
v/c Ratio	0.11	0.74		0.54	0.28	0.11	0.72	0.62	0.07	0.68	0.41	
Uniform Delay, d1	34.1	39.8		47.3	26.0	24.4	42.9	23.5	12.7	45.9	23.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.36	1.00	1.00	1.33	0.82	
Incremental Delay, d2	0.2	3.6		1.9	0.1	0.1	5.6	1.6	0.0	6.1	0.8	
Delay (s)	34.3	43.4		49.1	26.0	24.4	63.9	25.1	12.7	67.1	20.4	
Level of Service	C	D		D	C	C	E	C	B	E	C	
Approach Delay (s)		43.1			29.2			31.0			30.3	
Approach LOS		D			C			C			C	

Intersection Summary		
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.68	
Actuated Cycle Length (s)	110.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	67.8%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
4: Mission Bell Dr & El Portal Dr.

Alternative 2 - PM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	386	80	22	358	35	0	0	45	57	14	23
Future Volume (Veh/h)	20	386	80	22	358	35	0	0	45	57	14	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	420	87	24	389	38	0	0	49	62	15	25
Pedestrians		1						2				
Lane Width (ft)		12.0						12.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		264										
pX, platoon unblocked												
vC, conflicting volume	427			509			980	984	256	710	1009	409
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	427			509			980	984	256	710	1009	409
tC, single (s)	4.2			4.1			7.5	6.5	6.9	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			98			100	100	93	78	93	96
cM capacity (veh/h)	1122			1058			181	239	749	278	218	572
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	232	297	24	427	49	62	40					
Volume Left	22	0	24	0	0	62	0					
Volume Right	0	87	0	38	49	0	25					
cSH	1122	1700	1058	1700	749	278	355					
Volume to Capacity	0.02	0.17	0.02	0.25	0.07	0.22	0.11					
Queue Length 95th (ft)	1	0	2	0	5	21	9					
Control Delay (s)	1.0	0.0	8.5	0.0	10.1	21.6	16.4					
Lane LOS	A		A		B	C	C					
Approach Delay (s)	0.4		0.5		10.1	19.6						
Approach LOS					B	C						
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			38.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
5: San Pablo Ave. & 23rd St./Road 20

Alternative 2 - PM Peak  
01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	454	92	87	17	91	40	99	528	32	44	279	357
Future Volume (vph)	454	92	87	17	91	40	99	528	32	44	279	357
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96		1.00	1.00	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1730	1542		1848	1583	1770	3498		1770	3539	1555
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1698	1730	1542		1848	1583	1770	3498		1770	3539	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	468	95	90	18	94	41	102	544	33	45	288	368
RTOR Reduction (vph)	0	0	47	0	0	36	0	2	0	0	0	196
Lane Group Flow (vph)	281	282	43	0	112	5	102	575	0	45	288	172
Confl. Peds. (#/hr)			15	15			8		12	12		8
Confl. Bikes (#/hr)			2						1			1
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA	pm+ov	Split	NA	Perm	Prot	NA		Prot	NA	pm+ov
Protected Phases	4	4	5	8	8		5	2		1	6	4
Permitted Phases			4			8						6
Actuated Green, G (s)	26.5	26.5	38.9		13.8	13.8	12.4	31.5		6.4	25.5	52.0
Effective Green, g (s)	26.5	26.5	38.9		13.8	13.8	12.4	31.5		6.4	25.5	52.0
Actuated g/C Ratio	0.24	0.24	0.35		0.12	0.12	0.11	0.28		0.06	0.23	0.47
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	5.0		2.0	5.0	2.0
Lane Grp Cap (vph)	405	413	540		229	196	197	992		102	813	728
v/s Ratio Prot	c0.17	0.16	0.01		c0.06		c0.06	c0.16		0.03	0.08	0.06
v/s Ratio Perm			0.02			0.00						0.05
v/c Ratio	0.69	0.68	0.08		0.49	0.03	0.52	0.58		0.44	0.35	0.24
Uniform Delay, d1	38.5	38.4	24.1		45.3	42.7	46.5	34.1		50.6	35.8	17.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.1	3.7	0.0		1.6	0.1	1.0	1.3		1.1	0.6	0.1
Delay (s)	42.7	42.1	24.1		47.0	42.7	47.4	35.4		51.7	36.4	17.7
Level of Service	D	D	C		D	D	D	D		D	D	B
Approach Delay (s)		39.9			45.8			37.2			27.6	
Approach LOS		D			D			D			C	

Intersection Summary

HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	111.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
6: Road 20 & Paseo Way

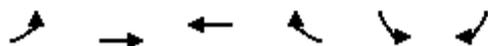
Alternative 2 - PM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	222	204	9	7	16
Future Volume (Veh/h)	10	222	204	9	7	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.48	0.48	0.72	0.72
Hourly flow rate (vph)	14	304	425	19	10	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		650	715			
pX, platoon unblocked						
vC, conflicting volume	444				766	434
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	444				766	434
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	96
cM capacity (veh/h)	1116				366	622
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	318	444	32			
Volume Left	14	0	10			
Volume Right	0	19	22			
cSH	1116	1700	510			
Volume to Capacity	0.01	0.26	0.06			
Queue Length 95th (ft)	1	0	5			
Control Delay (s)	0.5	0.0	12.5			
Lane LOS	A		B			
Approach Delay (s)	0.5	0.0	12.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization		29.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis  
7: Road 20 & Abella Circle West

Alternative 2 - PM Peak  
01/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	269	191	27	15	25
Future Volume (vph)	11	269	191	27	15	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1832		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1832		1770	1583
Peak-hour factor, PHF	0.72	0.72	0.53	0.53	0.77	0.77
Adj. Flow (vph)	15	374	360	51	19	32
RTOR Reduction (vph)	0	0	4	0	0	30
Lane Group Flow (vph)	15	374	407	0	19	2
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases						8
Actuated Green, G (s)	0.9	29.0	24.1		2.0	2.0
Effective Green, g (s)	0.9	29.0	24.1		2.0	2.0
Actuated g/C Ratio	0.02	0.74	0.62		0.05	0.05
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	4.0	4.0		2.0	2.0
Lane Grp Cap (vph)	40	1385	1132		90	81
v/s Ratio Prot	0.01	c0.20	c0.22		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.38	0.27	0.36		0.21	0.02
Uniform Delay, d1	18.8	1.6	3.7		17.7	17.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.1	0.1	0.3		0.4	0.0
Delay (s)	20.9	1.7	3.9		18.2	17.6
Level of Service	C	A	A		B	B
Approach Delay (s)		2.5	3.9		17.8	
Approach LOS		A	A		B	

Intersection Summary

HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
8: Abella Circle East & Road 20

Alternative 2 - PM Peak  
01/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	14	179	0	0	188	34	32	0	45	23	0	11
Future Volume (vph)	14	179	0	0	188	34	32	0	45	23	0	11
Peak Hour Factor	0.64	0.64	0.64	0.78	0.78	0.78	0.36	0.36	0.36	0.80	0.80	0.80
Hourly flow rate (vph)	22	280	0	0	241	44	89	0	125	29	0	14
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	302	285	214	43								
Volume Left (vph)	22	0	89	29								
Volume Right (vph)	0	44	125	14								
Hadj (s)	0.05	-0.06	-0.23	-0.03								
Departure Headway (s)	5.1	5.0	5.2	5.8								
Degree Utilization, x	0.42	0.39	0.31	0.07								
Capacity (veh/h)	670	682	622	532								
Control Delay (s)	11.8	11.2	10.6	9.2								
Approach Delay (s)	11.8	11.2	10.6	9.2								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay			11.1									
Level of Service			B									
Intersection Capacity Utilization			32.3%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
 9: EI Portal Dr/EI Portal Dr. & Road 20/Private Driveway

Alternative 2 - PM Peak

01/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖			↖	↖	↕			↕	↖
Traffic Volume (vph)	52	0	195	0	0	3	163	582	0	0	701	59
Future Volume (vph)	52	0	195	0	0	3	163	582	0	0	701	59
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		1.00			1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes	1.00		0.98			1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00			1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85			0.86	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1736		1520			1644	1770	3539			3574	1599
Flt Permitted	0.95		1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1736		1520			1644	1770	3539			3574	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	54	0	203	0	0	3	170	606	0	0	730	61
RTOR Reduction (vph)	0	0	174	0	0	3	0	0	0	0	0	42
Lane Group Flow (vph)	54	0	29	0	0	0	170	606	0	0	730	19
Confl. Peds. (#/hr)			10	10			8		6	6		8
Confl. Bikes (#/hr)									4			1
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Turn Type	Prot		Perm			Perm	Prot	NA			NA	Prot
Protected Phases	4						5				6	6
Permitted Phases			4			8		2				
Actuated Green, G (s)	7.4		7.4			7.4	16.0	36.0			16.0	16.0
Effective Green, g (s)	7.4		7.4			7.4	16.0	36.0			16.0	16.0
Actuated g/C Ratio	0.14		0.14			0.14	0.31	0.70			0.31	0.31
Clearance Time (s)	4.0		4.0			4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	249		218			236	550	2478			1112	497
v/s Ratio Prot	c0.03						c0.10				c0.20	0.01
v/s Ratio Perm			0.02			0.00		0.17				
v/c Ratio	0.22		0.13			0.00	0.31	0.24			0.66	0.04
Uniform Delay, d1	19.4		19.2			18.8	13.5	2.8			15.3	12.3
Progression Factor	1.00		1.00			1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4		0.3			0.0	1.5	0.2			3.0	0.1
Delay (s)	19.9		19.5			18.8	14.9	3.0			18.4	12.5
Level of Service	B		B			B	B	A			B	B
Approach Delay (s)		19.6			18.8			5.6			17.9	
Approach LOS		B			B			A			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.9								B	
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			51.4							12.0		
Intersection Capacity Utilization			41.7%								A	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
10: Church Ln & El Portal Dr

Alternative 2 - PM Peak

01/05/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 									 		
Traffic Volume (vph)	115	593	188	273	532	21	128	199	308	19	137	85	
Future Volume (vph)	115	593	188	273	532	21	128	199	308	19	137	85	
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	5.0	5.0	5.0	5.0		
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.93	1.00	1.00	0.99	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	1.00		
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1770	3387		1770	1863	1475	1765	1863	1563	1770	1732		
Flt Permitted	0.22	1.00		0.13	1.00	1.00	0.30	1.00	1.00	0.63	1.00		
Satd. Flow (perm)	407	3387		246	1863	1475	555	1863	1563	1174	1732		
Peak-hour factor, PHF	0.91	0.91	0.91	0.88	0.88	0.88	0.98	0.98	0.98	0.80	0.80	0.80	
Adj. Flow (vph)	126	652	207	310	605	24	131	203	314	24	171	106	
RTOR Reduction (vph)	0	24	0	0	0	14	0	0	240	0	18	0	
Lane Group Flow (vph)	126	835	0	310	605	10	131	203	74	24	259	0	
Confl. Peds. (#/hr)	13		2	2		13	14					14	
Confl. Bikes (#/hr)			2						1			3	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	custom	pm+pt	NA		
Protected Phases	5	2		1	6		7	4		3	8		
Permitted Phases	2			6		6	4		8	8			
Actuated Green, G (s)	43.3	35.2		57.5	44.4	44.4	39.6	32.5	25.2	27.3	25.2		
Effective Green, g (s)	43.3	35.2		57.5	44.4	44.4	39.6	32.5	25.2	27.3	25.2		
Actuated g/C Ratio	0.40	0.33		0.54	0.41	0.41	0.37	0.30	0.24	0.25	0.24		
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	2.0	6.0		2.5	6.0	6.0	2.0	4.0	4.0	2.5	4.0		
Lane Grp Cap (vph)	267	1113		378	772	611	311	565	367	310	407		
v/s Ratio Prot	0.04	0.25		c0.13	0.32		c0.04	0.11		0.00	c0.15		
v/s Ratio Perm	0.15			c0.31		0.01	0.12		0.05	0.02			
v/c Ratio	0.47	0.75		0.82	0.78	0.02	0.42	0.36	0.20	0.08	0.64		
Uniform Delay, d1	22.2	32.0		23.8	27.2	18.5	24.2	29.2	32.9	30.1	36.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.5	3.8		13.0	6.5	0.0	0.3	0.5	0.4	0.1	3.7		
Delay (s)	22.6	35.8		36.8	33.6	18.5	24.5	29.7	33.2	30.2	40.5		
Level of Service	C	D		D	C	B	C	C	C	C	D		
Approach Delay (s)		34.1			34.3			30.4			39.7		
Approach LOS		C			C			C			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			33.9									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.75										
Actuated Cycle Length (s)			107.1									Sum of lost time (s)	20.0
Intersection Capacity Utilization			76.0%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group