Appendix S

Horizon Year (2030) Intersection LOS Calculations

AM Horizon Year

1: Pala Rd (SR-76) & Via Monserate — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1230	1938	50	100	40
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	1295	2040	53	105	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2093				2735	1046
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2093				2735	1046
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				0	81
cM capacity (veh/h)	260				16	225

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	11	647	647	1360	733	42
Volume Left	11	0	0	0	0	0
Volume Right	0	0	0	0	53	42
cSH	260	1700	1700	1700	1700	225
Volume to Capacity	0.04	0.38	0.38	0.80	0.43	0.19
Queue Length 95th (ft)	3	0	0	0	0	17
Control Delay (s)	19.4	0.0	0.0	0.0	0.0	24.7
Lane LOS	C					C
Approach Delay (s)	0.2			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

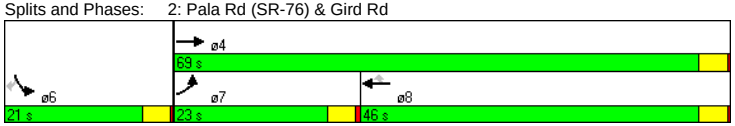
AM Horizon Year

2: Pala Rd (SR-76) & Gird Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	160	1190	1308	50	90	140
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	23.0	69.0	46.0	46.0	21.0	21.0
Total Split (%)	25.6%	76.7%	51.1%	51.1%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	12.0	44.0	31.4	31.4	10.1	10.1
Actuated g/C Ratio	0.18	0.69	0.49	0.49	0.16	0.16
v/c Ratio	0.58	0.51	0.79	0.08	0.38	0.42
Control Delay	36.6	4.9	18.7	9.6	34.9	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	4.9	18.7	9.6	34.9	10.5
LOS	D	A	B	A	C	B
Approach Delay		8.6	18.4		20.1	
Approach LOS		A	B		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63.7	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 61.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



LOS Engineering

AM Horizon Year
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				10		147
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	160	1190	1308	50	90	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1253	1377	53	95	147
Lane Group Flow (vph)	168	1253	1377	53	95	147
v/c Ratio	0.58	0.51	0.79	0.08	0.38	0.42
Control Delay	36.6	4.9	18.7	9.6	34.9	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	4.9	18.7	9.6	34.9	10.5
Queue Length 50th (ft)	64	80	227	9	37	0
Queue Length 95th (ft)	145	153	420	32	93	51
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	435	2784	2052	826	418	482
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.45	0.67	0.06	0.23	0.30

Intersection Summary
Area Type: Other

LOS Engineering

AM Horizon Year
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Volume (vph)	160	1190	1308	50	90	140
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1253	1377	53	95	147
RTOR Reduction (vph)	0	0	0	5	0	124
Lane Group Flow (vph)	168	1253	1377	48	95	23
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	9.7	45.1	31.4	31.4	10.1	10.1
Effective Green, g (s)	9.7	45.1	31.4	31.4	10.1	10.1
Actuated g/C Ratio	0.15	0.71	0.50	0.50	0.16	0.16
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)	243	2525	1758	704	253	226
v/s Ratio Prot	c0.11	0.35	c0.39		c0.06	
v/s Ratio Perm				0.03		0.02
v/c Ratio	0.69	0.50	0.78	0.07	0.38	0.10
Uniform Delay, d1	25.3	4.0	13.1	8.3	23.7	22.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	0.2	2.4	0.0	0.9	0.2
Delay (s)	33.5	4.2	15.5	8.3	24.7	22.9
Level of Service	C	A	B	A	C	C
Approach Delay (s)		7.6	15.2		23.6	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year

3: Pala Rd (SR-76) & Sage Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1050	1558	10	10	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	1105	1640	11	11	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1651				2219	825
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1651				2219	825
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				71	93
cM capacity (veh/h)	387				36	316

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	11	553	553	1093	557	21
Volume Left	11	0	0	0	0	0
Volume Right	0	0	0	0	11	21
cSH	387	1700	1700	1700	1700	316
Volume to Capacity	0.03	0.33	0.33	0.64	0.33	0.07
Queue Length 95th (ft)	2	0	0	0	0	5
Control Delay (s)	14.6	0.0	0.0	0.0	0.0	17.2
Lane LOS	B					C
Approach Delay (s)	0.1			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

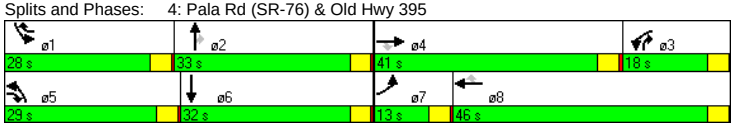
AM Horizon Year

4: Pala Rd (SR-76) & Old Hwy 395 — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	93	697	160	90	1131	200	290	207	200	500	221
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	5	3	8	1	5	2	3	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	13.0	41.0	29.0	18.0	46.0	28.0	29.0	33.0	18.0	28.0	32.0
Total Split (%)	10.8%	34.2%	24.2%	15.0%	38.3%	23.3%	24.2%	27.5%	15.0%	23.3%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	Min	None	None	Min	Min	Min	None	Min	Min
Act Effct Green (s)	8.8	29.1	52.8	20.0	40.3	66.6	23.6	25.7	45.7	22.3	24.4
Actuated g/C Ratio	0.08	0.26	0.47	0.18	0.36	0.59	0.21	0.23	0.40	0.20	0.22
v/c Ratio	0.79	0.81	0.22	0.34	0.95	0.23	0.92	0.52	0.35	0.87	0.87
Control Delay	93.9	47.1	1.9	49.7	52.0	3.5	79.1	43.8	12.3	61.2	64.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.9	47.1	1.9	49.7	52.0	3.5	79.1	43.8	12.3	61.2	64.2
LOS	F	D	A	D	D	A	E	D	B	E	E
Approach Delay		44.1			45.0			49.4			62.4
Approach LOS		D			D			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 49.3	Intersection LOS: D
Intersection Capacity Utilization 86.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

AM Horizon Year
4: Pala Rd (SR-76) & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	1		1	2		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850			0.850		0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1771	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168			170			39		19	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	93	697	160	90	1131	200	290	207	200	500	221	107
Peak Hour Factor	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)	98	734	168	95	1191	211	305	218	211	526	233	113
Lane Group Flow (vph)	98	734	168	95	1191	211	305	218	211	526	346	0
v/c Ratio	0.79	0.81	0.22	0.34	0.95	0.23	0.92	0.52	0.35	0.87	0.87	
Control Delay	93.9	47.1	1.9	49.7	52.0	3.5	79.1	43.8	12.3	61.2	64.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	93.9	47.1	1.9	49.7	52.0	3.5	79.1	43.8	12.3	61.2	64.2	
Queue Length 50th (ft)	76	281	0	66	472	13	234	146	45	204	242	
Queue Length 95th (ft)	#175	329	20	128	#621	47	#405	225	91	#293	#390	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	127	1086	760	280	1298	893	347	466	595	645	441	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.77	0.68	0.22	0.34	0.92	0.24	0.88	0.47	0.35	0.82	0.78	

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year
4: Pala Rd (SR-76) & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
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)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1771	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1771	
Volume (vph)	93	697	160	90	1131	200	290	207	200	500	221	107
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)	98	734	168	95	1191	211	305	218	211	526	233	113
RTOR Reduction (vph)	0	0	90	0	0	76	0	0	23	0	15	0
Lane Group Flow (vph)	98	734	78	95	1191	135	305	218	188	526	331	0
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	8.8	29.1	52.8	20.0	40.3	62.6	23.7	25.8	45.8	22.3	24.4	
Effective Green, g (s)	8.8	29.1	52.8	20.0	40.3	62.6	23.7	25.8	45.8	22.3	24.4	
Actuated g/C Ratio	0.08	0.26	0.47	0.18	0.36	0.55	0.21	0.23	0.40	0.20	0.22	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	123	910	661	280	1260	834	331	425	573	605	382	
v/s Ratio Prot	0.06	c0.21	0.02	0.06	c0.34	0.03	c0.19	0.12	0.06	0.17	c0.19	
v/s Ratio Perm			0.03			0.06			0.07			
v/c Ratio	0.80	0.81	0.12	0.34	0.95	0.16	0.92	0.51	0.33	0.87	0.87	
Uniform Delay, d1	51.3	39.4	17.1	40.8	35.4	12.4	43.8	38.2	23.1	44.0	42.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	29.0	5.3	0.1	0.7	14.2	0.1	30.1	1.0	0.3	12.6	18.2	
Delay (s)	80.3	44.7	17.1	41.5	49.5	12.5	73.9	39.3	23.5	56.7	61.1	
Level of Service	F	D	B	D	D	B	E	D	C	E	E	
Approach Delay (s)		43.6			43.8			49.1			58.4	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	47.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	113.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

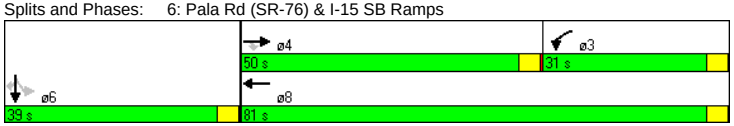
AM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps

Timings

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	997	400	396	821	147	10	600
Turn Type		Perm	Prot		Perm		Perm
Protected Phases	4		3	8		6	
Permitted Phases		4			6		6
Detector Phases	4	4	3	8	6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	50.0	50.0	31.0	81.0	39.0	39.0	39.0
Total Split (%)	41.7%	41.7%	25.8%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	42.7	42.7	20.2	66.9	45.1	45.1	45.1
Actuated g/C Ratio	0.36	0.36	0.17	0.56	0.38	0.38	0.38
v/c Ratio	0.83	0.55	0.81	0.44	0.27	0.49	0.51
Control Delay	41.5	5.6	65.9	17.7	31.0	16.7	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	5.6	65.9	17.7	31.0	16.7	16.6
LOS	D	A	E	B	C	B	B
Approach Delay	31.2			33.4		19.4	
Approach LOS	C			C		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 29.3	Intersection LOS: C
Intersection Capacity Utilization 65.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



AM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	2		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.855	0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1417	3072	3539	0	0	0	0	1504	1449	1346
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1417	3072	3539	0	0	0	0	1504	1449	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			408								187	187
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	997	400	396	821	0	0	0	0	147	10	600
Peak Hour Factor	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)	0	1049	421	417	864	0	0	0	0	155	11	632
Lane Group Flow (vph)	0	1049	421	417	864	0	0	0	0	155	327	316
v/c Ratio		0.83	0.55	0.81	0.44					0.27	0.49	0.51
Control Delay		41.5	5.6	65.9	17.7					31.0	16.7	16.6
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		41.5	5.6	65.9	17.7					31.0	16.7	16.6
Queue Length 50th (ft)		383	6	175	326					87	84	74
Queue Length 95th (ft)		441	75	m198	m405					169	213	196
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		1386	803	691	2283					570	665	626
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.76	0.52	0.60	0.38					0.27	0.49	0.50

Intersection Summary	
Area Type:	Other
m Volume for 95th percentile queue is metered by upstream signal.	

AM Horizon Year

6: Pala Rd (SR-76) & I-15 SB Ramps — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.86	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3539	1417	3072	3539					1504	1449	1346
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3539	1417	3072	3539					1504	1449	1346
Volume (vph)	0	997	400	396	821	0	0	0	0	147	10	600
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)	0	1049	421	417	864	0	0	0	0	155	11	632
RTOR Reduction (vph)	0	0	263	0	0	0	0	0	0	0	117	117
Lane Group Flow (vph)	0	1049	158	417	864	0	0	0	0	155	210	199
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		42.7	42.7	20.2	66.9					45.1	45.1	45.1
Effective Green, g (s)		42.7	42.7	20.2	66.9					45.1	45.1	45.1
Actuated g/C Ratio		0.36	0.36	0.17	0.56					0.38	0.38	0.38
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)		1259	504	517	1973					565	545	506
v/s Ratio Prot		c0.30		c0.14	0.24							
v/s Ratio Perm			0.11							0.10	0.15	c0.15
v/c Ratio		0.83	0.31	0.81	0.44					0.27	0.39	0.39
Uniform Delay, d1		35.4	28.0	48.0	15.5					26.1	27.3	27.4
Progression Factor		1.00	1.00	1.21	1.15					1.00	1.00	1.00
Incremental Delay, d2		4.9	0.4	6.0	0.1					1.2	2.1	2.3
Delay (s)		40.3	28.4	63.9	17.9					27.3	29.4	29.7
Level of Service		D	C	E	B					C	C	C
Approach Delay (s)		36.9			32.9			0.0			29.1	
Approach LOS		D			C			A			C	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

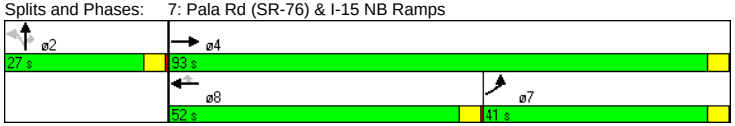
AM Horizon Year

7: Pala Rd (SR-76) & I-15 NB Ramps — Timings

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Volume (vph)	550	594	937	130	280	10	370
Turn Type	Prot			Perm	Perm		Perm
Protected Phases	7	4	8			2	
Permitted Phases				8	2		2
Detector Phases	7	4	8	8	2	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	41.0	93.0	52.0	52.0	27.0	27.0	27.0
Total Split (%)	34.2%	77.5%	43.3%	43.3%	22.5%	22.5%	22.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	30.6	73.7	39.2	39.2	38.3	38.3	38.3
Actuated g/C Ratio	0.26	0.61	0.33	0.33	0.32	0.32	0.32
v/c Ratio	0.74	0.29	0.85	0.28	0.35	0.41	0.49
Control Delay	63.7	25.7	45.3	20.8	38.9	36.5	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.7	25.7	45.3	20.8	38.9	36.5	7.5
LOS	E	C	D	C	D	D	A
Approach Delay		43.9	42.3			23.9	
Approach LOS		D	D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 38.7	Intersection LOS: D
Intersection Capacity Utilization 65.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



LOS Engineering

AM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.91	0.95	1.00	1.00	1.00
Frt						0.850		0.949	0.850			
Flt Protected	0.950						0.950	0.971				
Satd. Flow (prot)	3072	3539	0	0	3539	1417	1504	1562	1346	0	0	0
Flt Permitted	0.950						0.950	0.971				
Satd. Flow (perm)	3072	3539	0	0	3539	1417	1504	1562	1346	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						40		19	317			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	550	594	0	0	937	130	280	10	370	0	0	0
Peak Hour Factor	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)	579	625	0	0	986	137	295	11	389	0	0	0
Lane Group Flow (vph)	579	625	0	0	986	137	168	210	317	0	0	0
v/c Ratio	0.74	0.29			0.85	0.28	0.35	0.41	0.49			
Control Delay	63.7	25.7			45.3	20.8	38.9	36.5	7.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	63.7	25.7			45.3	20.8	38.9	36.5	7.5			
Queue Length 50th (ft)	220	208			373	54	101	123	0			
Queue Length 95th (ft)	m236	m220			407	94	206	248	89			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	971	2625			1416	591	480	511	645			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.60	0.24			0.70	0.23	0.35	0.41	0.49			

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frt	1.00	1.00			1.00	0.85	1.00	0.95	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (prot)	3072	3539			3539	1417	1504	1561	1346			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (perm)	3072	3539			3539	1417	1504	1561	1346			
Volume (vph)	550	594	0	0	937	130	280	10	370	0	0	0
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)	579	625	0	0	986	137	295	11	389	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	27	0	13	216	0	0	0
Lane Group Flow (vph)	579	625	0	0	986	110	168	197	101	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	30.6	73.8			39.2	39.2	38.2	38.2	38.2			
Effective Green, g (s)	30.6	73.8			39.2	39.2	38.2	38.2	38.2			
Actuated g/C Ratio	0.26	0.61			0.33	0.33	0.32	0.32	0.32			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	783	2176			1156	463	479	497	428			
v/s Ratio Prot	c0.19	0.18			c0.28							
v/s Ratio Perm						0.08	0.11	0.13	0.07			
v/c Ratio	0.74	0.29			0.85	0.24	0.35	0.40	0.24			
Uniform Delay, d1	41.0	10.8			37.7	29.5	31.4	31.9	30.1			
Progression Factor	1.48	2.44			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	2.3	0.0			6.3	0.3	2.0	2.4	1.3			
Delay (s)	63.1	26.4			44.0	29.8	33.4	34.3	31.4			
Level of Service	E	C			D	C	C	C	C			
Approach Delay (s)		44.0			42.2			32.8			0.0	
Approach LOS		D			D			C			A	

Intersection Summary

HCM Average Control Delay	40.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

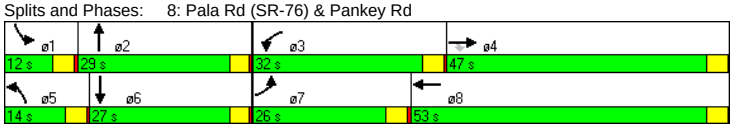
AM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	149	655	160	146	882	120	264	40	182
Turn Type	Prot		Perm	Prot		Prot		Prot	
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phases	7	4	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	26.0	47.0	47.0	32.0	53.0	14.0	29.0	12.0	27.0
Total Split (%)	21.7%	39.2%	39.2%	26.7%	44.2%	11.7%	24.2%	10.0%	22.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	13.2	29.8	29.8	13.3	29.9	9.0	17.0	7.9	13.5
Actuated g/C Ratio	0.17	0.39	0.39	0.17	0.39	0.11	0.22	0.10	0.18
v/c Ratio	0.59	0.50	0.26	0.57	0.75	0.36	0.55	0.27	0.41
Control Delay	46.2	21.5	4.7	45.3	26.1	44.3	28.3	49.0	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	21.5	4.7	45.3	26.1	44.3	28.3	49.0	31.9
LOS	D	C	A	D	C	D	C	D	C
Approach Delay		22.5			28.6		31.9		34.3
Approach LOS		C			C		C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 76.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 27.7	Intersection LOS: C
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Pala Rd (SR-76) & Pankey Rd



LOS Engineering

AM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.986			0.944			0.961	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3490	0	3072	3341	0	1583	3401	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3490	0	3072	3341	0	1583	3401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168		11			94			37	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2232			2833			991			1488	
Travel Time (s)		50.7			64.4			22.5			33.8	
Volume (vph)	149	655	160	146	882	90	120	264	159	40	182	65
Peak Hour Factor	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)	157	689	168	154	928	95	126	278	167	42	192	68
Lane Group Flow (vph)	157	689	168	154	1023	0	126	445	0	42	260	0
v/c Ratio	0.59	0.50	0.26	0.57	0.75		0.36	0.55		0.27	0.41	
Control Delay	46.2	21.5	4.7	45.3	26.1		44.3	28.3		49.0	31.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	46.2	21.5	4.7	45.3	26.1		44.3	28.3		49.0	31.9	
Queue Length 50th (ft)	75	139	0	74	234		31	88		20	54	
Queue Length 95th (ft)	181	257	43	175	408		80	185		70	121	
Internal Link Dist (ft)		2152			2753			911			1408	
Turn Bay Length (ft)												
Base Capacity (vph)	436	1807	806	513	1877		444	1174		182	1060	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.36	0.38	0.21	0.30	0.55		0.28	0.38		0.23	0.25	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Horizon Year

8: Pala Rd (SR-76) & Pankey Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3539	1417	1583	3490		3072	3340		1583	3400	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3490		3072	3340		1583	3400	
Volume (vph)	149	655	160	146	882	90	120	264	159	40	182	65
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)	157	689	168	154	928	95	126	278	167	42	192	68
RTOR Reduction (vph)	0	0	103	0	7	0	0	73	0	0	30	0
Lane Group Flow (vph)	157	689	65	154	1016	0	126	372	0	42	230	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	10.4	29.8	29.8	10.5	29.9		6.2	17.0		3.7	14.5	
Effective Green, g (s)	10.4	29.8	29.8	10.5	29.9		6.2	17.0		3.7	14.5	
Actuated g/C Ratio	0.14	0.39	0.39	0.14	0.39		0.08	0.22		0.05	0.19	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	1370	548	216	1355		247	737		76	640	
v/s Ratio Prot	c0.10	0.19		0.10	c0.29		c0.04	c0.11		0.03	0.07	
v/s Ratio Perm			0.05									
v/c Ratio	0.73	0.50	0.12	0.71	0.75		0.51	0.50		0.55	0.36	
Uniform Delay, d1	32.0	18.0	15.2	31.8	20.3		33.9	26.3		35.8	27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.2	0.3	0.1	10.6	2.4		1.8	0.5		8.4	0.3	
Delay (s)	44.2	18.3	15.3	42.4	22.7		35.7	26.9		44.3	27.6	
Level of Service	D	B	B	D	C		D	C		D	C	
Approach Delay (s)		21.8			25.3			28.8			29.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

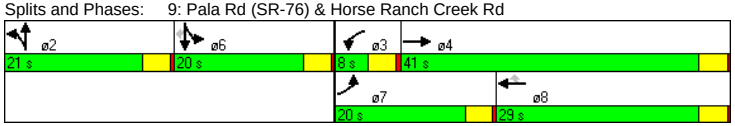
AM Horizon Year

9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	415	440	850	83	57	0	268		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	20.0	41.0	29.0	29.0	20.0	20.0	20.0	21.0	8.0
Total Split (%)	22.2%	45.6%	32.2%	32.2%	22.2%	22.2%	22.2%	23%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	13.7	39.7	21.9	21.9	8.3	8.3	8.3		
Actuated g/C Ratio	0.21	0.60	0.33	0.33	0.13	0.13	0.13		
v/c Ratio	0.68	0.22	0.76	0.16	0.32	0.20	0.21		
Control Delay	31.0	6.3	25.1	5.4	32.5	0.6	0.7		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	31.0	6.3	25.1	5.4	32.5	0.6	0.7		
LOS	C	A	C	A	C	A	A		
Approach Delay		18.3	23.3			6.3			
Approach LOS		B	C			A			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 65.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 18.7	Intersection LOS: B
Intersection Capacity Utilization 51.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.850	0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87					592	592
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	415	440	0	0	850	83	0	0	0	57	0	268
Peak Hour Factor	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)	437	463	0	0	895	87	0	0	0	60	0	282
Lane Group Flow (vph)	437	463	0	0	895	87	0	0	0	60	139	143
v/c Ratio	0.68	0.22			0.76	0.16				0.32	0.20	0.21
Control Delay	31.0	6.3			25.1	5.4				32.5	0.6	0.7
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	31.0	6.3			25.1	5.4				32.5	0.6	0.7
Queue Length 50th (ft)	88	38			172	0				25	0	0
Queue Length 95th (ft)	143	67			261	28				60	0	0
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	729	2181			1292	573				331	779	758
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.60	0.21			0.69	0.15				0.18	0.18	0.19

Intersection Summary
Area Type: Other

LOS Engineering

AM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1441	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1441	1346
Volume (vph)	415	440	0	0	850	83	0	0	0	57	0	268
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)	437	463	0	0	895	87	0	0	0	60	0	282
RTOR Reduction (vph)	0	0	0	0	0	58	0	0	0	0	121	125
Lane Group Flow (vph)	437	463	0	0	895	29	0	0	0	60	18	18
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	13.7	39.7			22.0	22.0				8.3	8.3	8.3
Effective Green, g (s)	13.7	39.7			22.0	22.0				8.3	8.3	8.3
Actuated g/C Ratio	0.21	0.61			0.34	0.34				0.13	0.13	0.13
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)	642	2142			1187	475				190	182	170
v/s Ratio Prot	c0.14	0.13			c0.25					c0.04	0.01	
v/s Ratio Perm						0.02						0.01
v/c Ratio	0.68	0.22			0.75	0.06				0.32	0.10	0.11
Uniform Delay, d1	23.9	5.9			19.4	14.8				26.1	25.3	25.4
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	3.0	0.1			2.8	0.1				1.0	0.2	0.3
Delay (s)	26.9	5.9			22.2	14.8				27.0	25.6	25.6
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		16.1			21.5			0.0			25.9	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	21.6
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

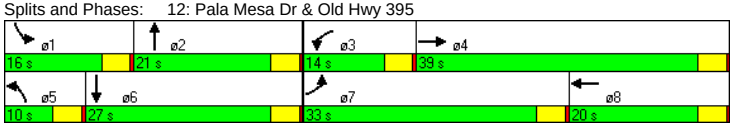
AM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	400	127	84	71	60	370	149	720
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	33.0	39.0	14.0	20.0	10.0	21.0	16.0	27.0
Total Split (%)	36.7%	43.3%	15.6%	22.2%	11.1%	23.3%	17.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	23.5	25.5	9.0	11.0	6.6	16.6	10.9	20.6
Actuated g/C Ratio	0.33	0.35	0.12	0.15	0.09	0.23	0.15	0.28
v/c Ratio	0.82	0.83	0.46	0.52	0.44	0.63	0.68	0.79
Control Delay	40.3	25.8	44.6	30.2	50.7	31.6	51.9	34.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	25.8	44.6	30.2	50.7	31.6	51.9	34.1
LOS	D	C	D	C	D	C	D	C
Approach Delay		31.7		35.4		33.7		37.0
Approach LOS		C		D		C		D

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 72.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 34.2 — Intersection LOS: C
Intersection Capacity Utilization 77.5% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 12: Pala Mesa Dr & Old Hwy 395



AM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	0		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.883			0.923			0.964			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1645	0	1583	1719	0	1583	3412	0	1583	3518	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1645	0	1583	1719	0	1583	3412	0	1583	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		232			51			42			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3628			1500			4464			5461	
Travel Time (s)		82.5			34.1			101.5			124.1	
Volume (vph)	400	127	450	84	71	75	60	370	118	149	720	30
Peak Hour Factor	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)	421	134	474	88	75	79	63	389	124	157	758	32
Lane Group Flow (vph)	421	608	0	88	154	0	63	513	0	157	790	0
v/c Ratio	0.82	0.83		0.46	0.52		0.44	0.63		0.68	0.79	
Control Delay	40.3	25.8		44.6	30.2		50.7	31.6		51.9	34.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.3	25.8		44.6	30.2		50.7	31.6		51.9	34.1	
Queue Length 50th (ft)	198	188		44	51		33	121		79	202	
Queue Length 95th (ft)	#378	336		96	111		#94	191		#182	#328	
Internal Link Dist (ft)		3548			1420			4384			5381	
Turn Bay Length (ft)							150			200		
Base Capacity (vph)	627	867		230	411		144	926		272	1178	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.67	0.70		0.38	0.37		0.44	0.55		0.58	0.67	

Intersection Summary

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

AM Horizon Year

12: Pala Mesa Dr & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.92		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1645		1583	1719		1583	3411		1583	3518	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1645		1583	1719		1583	3411		1583	3518	
Volume (vph)	400	127	450	84	71	75	60	370	118	149	720	30
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)	421	134	474	88	75	79	63	389	124	157	758	32
RTOR Reduction (vph)	0	151	0	0	45	0	0	32	0	0	3	0
Lane Group Flow (vph)	421	457	0	88	109	0	63	481	0	157	787	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	23.5	25.5		6.5	8.5		4.2	16.7		8.1	20.6	
Effective Green, g (s)	23.5	25.5		6.5	8.5		4.2	16.7		8.1	20.6	
Actuated g/C Ratio	0.32	0.35		0.09	0.12		0.06	0.23		0.11	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	511	576		141	201		91	782		176	995	
v/s Ratio Prot	c0.27	c0.28		0.06	0.06		0.04	0.14		c0.10	c0.22	
v/s Ratio Perm												
v/c Ratio	0.82	0.79		0.62	0.54		0.69	0.61		0.89	0.79	
Uniform Delay, d1	22.7	21.3		32.0	30.3		33.7	25.2		31.9	24.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.4	7.4		8.3	3.0		20.3	1.4		38.7	4.4	
Delay (s)	33.1	28.7		40.3	33.3		54.0	26.6		70.7	28.5	
Level of Service	C	C		D	C		D	C		E	C	
Approach Delay (s)		30.5			35.8			29.6			35.5	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	32.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

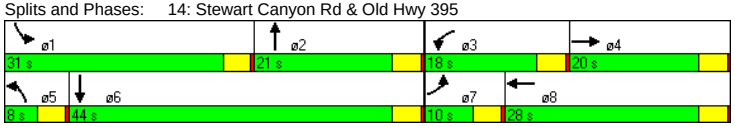
AM Horizon Year

14: Stewart Canyon Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	30	20	135	10	10	410	291	1010
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	10.0	20.0	18.0	28.0	8.0	21.0	31.0	44.0
Total Split (%)	11.1%	22.2%	20.0%	31.1%	8.9%	23.3%	34.4%	48.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.4	7.3	10.4	13.2	4.6	21.6	16.2	37.0
Actuated g/C Ratio	0.10	0.12	0.17	0.22	0.07	0.37	0.27	0.64
v/c Ratio	0.20	0.30	0.52	0.44	0.10	0.35	0.72	0.49
Control Delay	37.9	18.3	35.0	8.1	39.9	23.7	31.8	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	18.3	35.0	8.1	39.9	23.7	31.8	10.9
LOS	D	B	D	A	D	C	C	B
Approach Delay		24.2		18.5		24.1		15.5
Approach LOS		C		B		C		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 58	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Stewart Canyon Rd & Old Hwy 395



LOS Engineering

AM Horizon Year

14: Stewart Canyon Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	200		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.893			0.857			0.990			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1663	0	1583	1596	0	1583	3504	0	1583	3525	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1663	0	1583	1596	0	1583	3504	0	1583	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53			215			7			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1302			7424			5461			3410	
Travel Time (s)		29.6			168.7			124.1			77.5	
Volume (vph)	30	20	50	135	10	204	10	410	29	291	1010	30
Peak Hour Factor	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)	32	21	53	142	11	215	11	432	31	306	1063	32
Lane Group Flow (vph)	32	74	0	142	226	0	11	463	0	306	1095	0
v/c Ratio	0.20	0.30		0.52	0.44		0.10	0.35		0.72	0.49	
Control Delay	37.9	18.3		35.0	8.1		39.9	23.7		31.8	10.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	37.9	18.3		35.0	8.1		39.9	23.7		31.8	10.9	
Queue Length 50th (ft)	12	8		51	3		4	85		108	134	
Queue Length 95th (ft)	44	49		128	61		22	168		220	287	
Internal Link Dist (ft)		1222			7344			5381			3330	
Turn Bay Length (ft)				200			100			100		
Base Capacity (vph)	165	441		376	709		112	1431		628	2356	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.17		0.38	0.32		0.10	0.32		0.49	0.46	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

14: Stewart Canyon Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		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)	1583	1663		1583	1597		1583	3504		1583	3524	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1663		1583	1597		1583	3504		1583	3524	
Volume (vph)	30	20	50	135	10	204	10	410	29	291	1010	30
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)	32	21	53	142	11	215	11	432	31	306	1063	32
RTOR Reduction (vph)	0	49	0	0	179	0	0	5	0	0	2	0
Lane Group Flow (vph)	32	25	0	142	47	0	11	458	0	306	1093	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.7	4.4		8.2	10.9		0.6	22.3		13.4	35.1	
Effective Green, g (s)	1.7	4.4		8.2	10.9		0.6	22.3		13.4	35.1	
Actuated g/C Ratio	0.03	0.07		0.13	0.17		0.01	0.35		0.21	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	42	114		202	271		15	1215		330	1924	
v/s Ratio Prot	0.02	0.01		c0.09	c0.03		0.01	0.13		c0.19	c0.31	
v/s Ratio Perm												
v/c Ratio	0.76	0.22		0.70	0.18		0.73	0.38		0.93	0.57	
Uniform Delay, d1	31.1	28.3		26.9	22.9		31.8	15.8		25.0	9.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	56.2	1.0		10.6	0.3		103.2	0.2		31.1	0.4	
Delay (s)	87.2	29.3		37.4	23.2		135.0	16.0		56.1	10.0	
Level of Service	F	C		D	C		F	B		E	A	
Approach Delay (s)		46.8			28.7			18.7			20.1	
Approach LOS		D			C			B			C	

Intersection Summary

HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

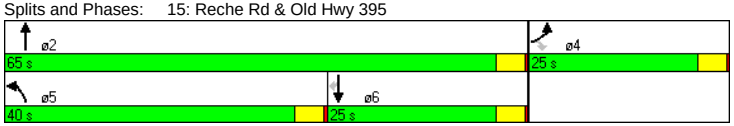
AM Horizon Year
15: Reche Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	280	283	472	222	248	460
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	40.0	65.0	25.0	25.0
Total Split (%)	27.8%	27.8%	44.4%	72.2%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	16.4	16.4	24.7	40.9	11.8	11.8
Actuated g/C Ratio	0.25	0.25	0.37	0.62	0.18	0.18
v/c Ratio	0.75	0.52	0.84	0.11	0.41	0.74
Control Delay	40.2	7.4	34.4	5.3	28.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	7.4	34.4	5.3	28.8	11.1
LOS	D	A	C	A	C	B
Approach Delay	23.7			25.1	17.3	
Approach LOS	C			C	B	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 66.2
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 21.9 — Intersection LOS: C
Intersection Capacity Utilization 67.7% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Reche Rd & Old Hwy 395



AM Horizon Year
15: Reche Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Storage Length (ft)	0	0	150			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		298				484
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	2635			3410	4960	
Travel Time (s)	59.9			77.5	112.7	
Volume (vph)	280	283	472	222	248	460
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	298	497	234	261	484
Lane Group Flow (vph)	295	298	497	234	261	484
v/c Ratio	0.75	0.52	0.84	0.11	0.41	0.74
Control Delay	40.2	7.4	34.4	5.3	28.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	7.4	34.4	5.3	28.8	11.1
Queue Length 50th (ft)	112	0	182	19	53	0
Queue Length 95th (ft)	#290	65	#406	33	100	90
Internal Link Dist (ft)	2555			3330	4880	
Turn Bay Length (ft)			150			
Base Capacity (vph)	492	646	756	2535	1034	757
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.46	0.66	0.09	0.25	0.64

Intersection Summary

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

AM Horizon Year
15: Reche Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
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
Frt	1.00	0.85	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)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Volume (vph)	280	283	472	222	248	460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	298	497	234	261	484
RTOR Reduction (vph)	0	223	0	0	0	394
Lane Group Flow (vph)	295	75	497	234	261	90
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	16.4	16.4	24.7	40.9	12.2	12.2
Effective Green, g (s)	16.4	16.4	24.7	40.9	12.2	12.2
Actuated g/C Ratio	0.25	0.25	0.38	0.63	0.19	0.19
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)	398	356	599	2217	661	265
v/s Ratio Prot	c0.19		c0.31	0.07	c0.07	
v/s Ratio Perm		0.05				0.06
v/c Ratio	0.74	0.21	0.83	0.11	0.39	0.34
Uniform Delay, d1	22.5	19.3	18.4	4.9	23.3	23.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	0.3	9.3	0.0	0.4	0.8
Delay (s)	29.8	19.6	27.7	4.9	23.7	23.8
Level of Service	C	B	C	A	C	C
Approach Delay (s)	24.7			20.4	23.8	
Approach LOS	C			C	C	

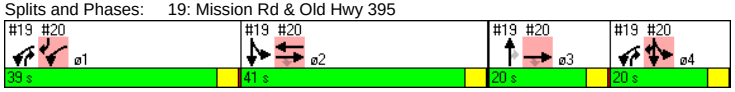
Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

AM Horizon Year
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	199	1120	85	237	850	69		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	59.0	0.0	20.0	59.0	41.0	41.0	39.0	20.0
Total Split (%)	49.2%	0.0%	16.7%	49.2%	34.2%	34.2%	33%	17%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	55.0	117.3	13.2	72.3	37.0	37.0		
Actuated g/C Ratio	0.47	1.00	0.11	0.62	0.32	0.32		
v/c Ratio	0.28	0.83	0.42	0.29	0.92	0.12		
Control Delay	23.6	5.3	54.6	11.4	55.0	30.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	23.6	5.3	54.6	11.4	55.0	30.2		
LOS	C	A	D	B	D	C		
Approach Delay	8.1		22.8			53.1		
Approach LOS	A		C			D		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.3	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 52.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	199	1120	85	237	850	69
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	1179	89	249	895	73
Lane Group Flow (vph)	209	1179	89	249	895	73
v/c Ratio	0.28	0.83	0.42	0.29	0.92	0.12
Control Delay	23.6	5.3	54.6	11.4	55.0	30.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	5.3	54.6	11.4	55.0	30.2
Queue Length 50th (ft)	101	155	64	82	342	40
Queue Length 95th (ft)	m110	m114	117	127	#477	78
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	743	1417	254	873	970	588
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.83	0.35	0.29	0.92	0.12

Intersection Summary

Area Type: Other

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

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	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	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Volume (vph)	199	1120	85	237	850	69
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	1179	89	249	895	73
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	209	1179	89	249	895	73
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	55.0	117.2	13.2	68.2	37.0	37.0
Effective Green, g (s)	55.0	117.2	13.2	68.2	37.0	37.0
Actuated g/C Ratio	0.47	1.00	0.11	0.58	0.32	0.32
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	743	1417	210	873	970	588
v/s Ratio Prot	0.13		0.05	0.13	c0.29	0.04
v/s Ratio Perm		c0.83		0.04		
v/c Ratio	0.28	0.83	0.42	0.29	0.92	0.12
Uniform Delay, d1	19.0	0.0	48.5	12.3	38.7	28.6
Progression Factor	1.17	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	2.0	1.4	0.2	13.8	0.1
Delay (s)	22.3	2.0	49.8	12.5	52.5	28.7
Level of Service	C	A	D	B	D	C
Approach Delay (s)	5.1		22.3			50.7
Approach LOS	A		C			D

Intersection Summary

HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	117.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

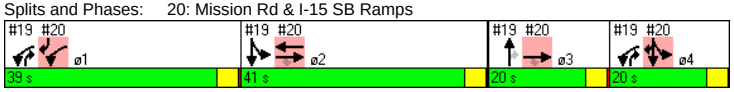
AM Horizon Year
20: Mission Rd & I-15 SB Ramps — Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR	ø3
Lane Configurations							
Volume (vph)	757	330	120	469	10	850	
Turn Type		Perm	Prot			custom	
Protected Phases	2 3		1	2	4	1 4	3
Permitted Phases		2 3				4	
Detector Phases	2 3	2 3	1	2	4	1 4	
Minimum Initial (s)			4.0	4.0	4.0		4.0
Minimum Split (s)			8.0	20.0	20.0		20.0
Total Split (s)	61.0	61.0	39.0	41.0	20.0	59.0	20.0
Total Split (%)	50.8%	50.8%	32.5%	34.2%	16.7%	49.2%	17%
Yellow Time (s)			3.5	3.5	3.5		3.5
All-Red Time (s)			0.5	0.5	0.5		0.5
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode			None	Min	None		None
Act Effct Green (s)	54.3	54.3	35.0	37.0	16.0	55.0	
Actuated g/C Ratio	0.46	0.46	0.30	0.32	0.14	0.47	
v/c Ratio	0.49	0.41	0.27	0.84	0.09	1.01	
Control Delay	7.8	0.9	34.0	52.2	46.5	49.8	
Queue Delay	0.5	0.5	0.0	0.0	0.0	0.0	
Total Delay	8.2	1.4	34.0	52.2	46.5	49.8	
LOS	A	A	C	D	D	D	
Approach Delay	6.2			48.5	49.7		
Approach LOS	A			D	D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 117.3
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 30.8 — Intersection LOS: C
Intersection Capacity Utilization 90.2% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



LOS Engineering

AM Horizon Year
20: Mission Rd & I-15 SB Ramps — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.976	
Satd. Flow (prot)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Flt Permitted				0.950							0.976	
Satd. Flow (perm)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			347									421
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	757	330	120	469	0	0	0	0	10	10	850
Peak Hour Factor	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)	0	797	347	126	494	0	0	0	0	11	11	895
Lane Group Flow (vph)	0	797	347	126	494	0	0	0	0	0	22	895
v/c Ratio		0.49	0.41	0.27	0.84						0.09	1.01
Control Delay		7.8	0.9	34.0	52.2						46.5	49.8
Queue Delay		0.5	0.5	0.0	0.0						0.0	0.0
Total Delay		8.2	1.4	34.0	52.2						46.5	49.8
Queue Length 50th (ft)		52	0	74	354						15	~499
Queue Length 95th (ft)		m62	m0	128	#545						41	#798
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		1721	867	473	588						248	889
Starvation Cap Reductn		467	199	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.64	0.52	0.27	0.84						0.09	1.01

Intersection Summary

Area Type: Other
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

LOS Engineering

AM Horizon Year
20: Mission Rd & I-15 SB Ramps — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.98	1.00
Satd. Flow (prot)		3539	1417	1583	1863						1817	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.98	1.00
Satd. Flow (perm)		3539	1417	1583	1863						1817	1417
Volume (vph)	0	757	330	120	469	0	0	0	0	10	10	850
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)	0	797	347	126	494	0	0	0	0	11	11	895
RTOR Reduction (vph)	0	0	187	0	0	0	0	0	0	0	0	223
Lane Group Flow (vph)	0	797	160	126	494	0	0	0	0	0	22	672
Turn Type			Perm	Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases			2 3									4
Actuated Green, G (s)		54.2	54.2	35.0	37.0						16.0	55.0
Effective Green, g (s)		54.2	54.2	35.0	37.0						16.0	55.0
Actuated g/C Ratio		0.46	0.46	0.30	0.32						0.14	0.47
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		1637	655	473	588						248	665
v/s Ratio Prot		c0.23		0.08	c0.27						0.01	c0.47
v/s Ratio Perm			0.11									
v/c Ratio		0.49	0.24	0.27	0.84						0.09	1.01
Uniform Delay, d1		21.9	19.1	31.3	37.3						44.2	31.1
Progression Factor		0.33	0.03	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.1	0.1	0.3	10.5						0.2	37.4
Delay (s)		7.3	0.6	31.6	47.8						44.4	68.5
Level of Service		A	A	C	D						D	E
Approach Delay (s)		5.2			44.5			0.0			67.9	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	117.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

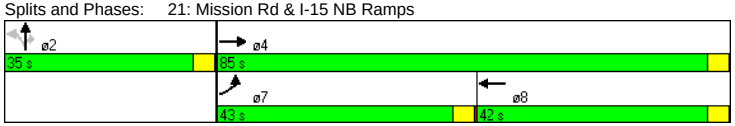
LOS Engineering

AM Horizon Year
21: Mission Rd & I-15 NB Ramps — Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	592	175	329	10	90
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	43.0	85.0	42.0	35.0	35.0
Total Split (%)	35.8%	70.8%	35.0%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	19.6	42.9	18.6	16.2	16.2
Actuated g/C Ratio	0.29	0.63	0.27	0.24	0.24
v/c Ratio	0.71	0.16	0.73	0.68	0.23
Control Delay	29.0	6.2	34.0	35.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	6.2	34.0	35.7	8.2
LOS	C	A	C	D	A
Approach Delay		23.8	34.0	28.8	
Approach LOS		C	C	C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 68.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 90.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



LOS Engineering

AM Horizon Year
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	2		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.992				0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	3072	1863	0	0	1848	0	0	1777	1417	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3072	1863	0	0	1848	0	0	1777	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3				95			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	592	175	0	0	329	20	260	10	90	0	0	0
Peak Hour Factor	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)	623	184	0	0	346	21	274	11	95	0	0	0
Lane Group Flow (vph)	623	184	0	0	367	0	0	285	95	0	0	0
v/c Ratio	0.71	0.16			0.73			0.68	0.23			
Control Delay	29.0	6.2			34.0			35.7	8.2			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	29.0	6.2			34.0			35.7	8.2			
Queue Length 50th (ft)	108	25			126			100	0			
Queue Length 95th (ft)	266	75			332			273	41			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	1427	1433			840			702	617			
Starvation Cap Reductn	0	0			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.44	0.13			0.44			0.41	0.15			

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	0.97	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)	3072	1863			1848			1777	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	3072	1863			1848			1777	1417			
Volume (vph)	592	175	0	0	329	20	260	10	90	0	0	0
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)	623	184	0	0	346	21	274	11	95	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	72	0	0	0
Lane Group Flow (vph)	623	184	0	0	365	0	0	285	23	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	19.6	42.9			19.3			16.3	16.3			
Effective Green, g (s)	19.6	42.9			19.3			16.3	16.3			
Actuated g/C Ratio	0.29	0.64			0.29			0.24	0.24			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	896	1189			531			431	344			
v/s Ratio Prot	c0.20	0.10			c0.20							
v/s Ratio Perm								0.16	0.02			
v/c Ratio	0.70	0.15			0.69			0.66	0.07			
Uniform Delay, d1	21.1	4.9			21.3			23.0	19.6			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	2.4	0.1			3.7			3.8	0.1			
Delay (s)	23.5	4.9			25.0			26.7	19.7			
Level of Service	C	A			C			C	B			
Approach Delay (s)		19.3			25.0			25.0			0.0	
Approach LOS		B			C			C			A	

Intersection Summary

HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Horizon Year

22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	30	290	199	20	30	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	305	209	21	32	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	487	47	63			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	487	47	63			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	70	86			
cM capacity (veh/h)	466	1022	1539			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	337	231	63
Volume Left	32	209	0
Volume Right	305	0	32
cSH	919	1539	1700
Volume to Capacity	0.37	0.14	0.04
Queue Length 95th (ft)	42	12	0
Control Delay (s)	11.2	7.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.2	7.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

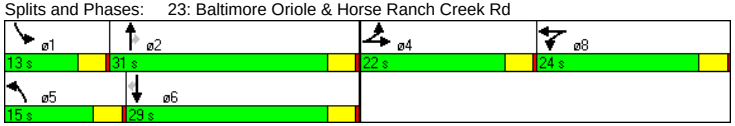
AM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	20	10	190	40	55	159	146	35	235	50
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.9	7.9	13.1	13.1	9.0	28.1	28.1	8.3	27.6	27.6
Actuated g/C Ratio	0.12	0.12	0.21	0.21	0.14	0.47	0.47	0.13	0.46	0.46
v/c Ratio	0.11	0.09	0.43	0.43	0.27	0.19	0.21	0.18	0.29	0.08
Control Delay	25.6	20.2	20.7	17.6	24.5	13.5	4.4	25.4	14.9	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	20.2	20.7	17.6	24.5	13.5	4.4	25.4	14.9	6.8
LOS	C	C	C	B	C	B	A	C	B	A
Approach Delay		22.9		19.0		11.5			14.7	
Approach LOS		C		B		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 59.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 40.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.932			0.949				0.850			0.850
Flt Protected	0.950			0.950	0.981		0.950			0.950		
Satd. Flow (prot)	1583	1736	0	1504	1647	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.981		0.950			0.950		
Satd. Flow (perm)	1583	1736	0	1504	1647	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			26				154			53
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	20	10	9	190	40	50	55	159	146	35	235	50
Peak Hour Factor	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)	21	11	9	200	42	53	58	167	154	37	247	53
Lane Group Flow (vph)	21	20	0	138	157	0	58	167	154	37	247	53
v/c Ratio	0.11	0.09		0.43	0.43		0.27	0.19	0.21	0.18	0.29	0.08
Control Delay	25.6	20.2		20.7	17.6		24.5	13.5	4.4	25.4	14.9	6.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	20.2		20.7	17.6		24.5	13.5	4.4	25.4	14.9	6.8
Queue Length 50th (ft)	2	1		11	10		5	12	0	3	19	0
Queue Length 95th (ft)	28	23		106	105		55	103	38	41	156	24
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	437	485		534	601		308	1126	918	260	1095	854
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04		0.26	0.26		0.19	0.15	0.17	0.14	0.23	0.06

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1737		1504	1647		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1737		1504	1647		1583	1863	1417	1583	1863	1417
Volume (vph)	20	10	9	190	40	50	55	159	146	35	235	50
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)	21	11	9	200	42	53	58	167	154	37	247	53
RTOR Reduction (vph)	0	9	0	0	21	0	0	0	85	0	0	30
Lane Group Flow (vph)	21	11	0	138	136	0	58	167	69	37	247	23
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	2.8	2.8		12.2	12.2		3.6	27.8	27.8	3.1	27.3	27.3
Effective Green, g (s)	2.8	2.8		12.2	12.2		3.6	27.8	27.8	3.1	27.3	27.3
Actuated g/C Ratio	0.05	0.05		0.20	0.20		0.06	0.45	0.45	0.05	0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	72	79		296	325		92	837	636	79	822	625
v/s Ratio Prot	c0.01	0.01		c0.09	0.08		c0.04	0.09		0.02	c0.13	
v/s Ratio Perm									0.05			0.02
v/c Ratio	0.29	0.14		0.47	0.42		0.63	0.20	0.11	0.47	0.30	0.04
Uniform Delay, d1	28.6	28.4		22.0	21.7		28.5	10.3	9.9	28.6	11.1	9.8
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	2.2	0.8		1.2	0.9		13.2	0.1	0.1	4.3	0.2	0.0
Delay (s)	30.8	29.2		23.1	22.6		41.7	10.4	10.0	32.9	11.4	9.9
Level of Service	C	C		C	C		D	B	A	C	B	A
Approach Delay (s)		30.1			22.9			15.0			13.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year

24: Longspur Rd & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	40	165	50	125	270	40	339
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	21.0	21.0	23.0	23.0	20.0	34.0	12.0	26.0
Total Split (%)	23.3%	23.3%	25.6%	25.6%	22.2%	37.8%	13.3%	28.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	8.3	8.3	12.4	12.4	12.0	45.2	7.4	38.1
Actuated g/C Ratio	0.10	0.10	0.15	0.15	0.14	0.55	0.09	0.46
v/c Ratio	0.14	0.44	0.59	0.56	0.59	0.25	0.31	0.26
Control Delay	32.8	22.8	38.6	30.8	39.0	8.6	39.0	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.8	22.8	38.6	30.8	39.0	8.6	39.0	17.4
LOS	C	C	D	C	D	A	D	B
Approach Delay		24.6		34.4		15.2		19.4
Approach LOS		C		C		B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 82.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

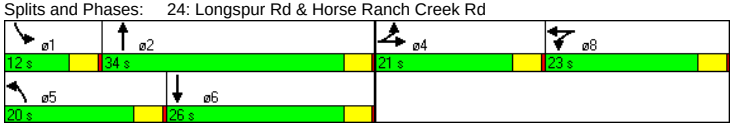
Maximum v/c Ratio: 0.59

Intersection Signal Delay: 20.9 — Intersection LOS: C

Intersection Capacity Utilization 43.1% — ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year

24: Longspur Rd & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.917			0.947			0.939			0.978	
Flt Protected	0.950			0.950	0.986		0.950			0.950		
Satd. Flow (prot)	1583	1708	0	1504	1652	0	1583	3323	0	1583	3461	0
Flt Permitted	0.950			0.950	0.986		0.950			0.950		
Satd. Flow (perm)	1583	1708	0	1504	1652	0	1583	3323	0	1583	3461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			28			196			21	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	20	40	49	165	50	50	125	270	186	40	339	60
Peak Hour Factor	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)	21	42	52	174	53	53	132	284	196	42	357	63
Lane Group Flow (vph)	21	94	0	130	150	0	132	480	0	42	420	0
v/c Ratio	0.14	0.44		0.59	0.56		0.59	0.25		0.31	0.26	
Control Delay	32.8	22.8		38.6	30.8		39.0	8.6		39.0	17.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.8	22.8		38.6	30.8		39.0	8.6		39.0	17.4	
Queue Length 50th (ft)	9	18		56	52		55	40		18	65	
Queue Length 95th (ft)	30	62		117	115		114	90		52	133	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	303	369		329	384		301	1908		152	1609	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.25		0.40	0.39		0.44	0.25		0.28	0.26	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.95		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1708		1504	1652		1583	3322		1583	3460	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1708		1504	1652		1583	3322		1583	3460	
Volume (vph)	20	40	49	165	50	50	125	270	186	40	339	60
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)	21	42	52	174	53	53	132	284	196	42	357	63
RTOR Reduction (vph)	0	47	0	0	24	0	0	92	0	0	11	0
Lane Group Flow (vph)	21	47	0	130	126	0	132	388	0	42	409	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.4	7.4		11.4	11.4		11.0	44.6		5.0	38.6	
Effective Green, g (s)	7.4	7.4		11.4	11.4		11.0	44.6		5.0	38.6	
Actuated g/C Ratio	0.09	0.09		0.14	0.14		0.13	0.53		0.06	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	139	150		203	223		206	1755		94	1582	
v/s Ratio Prot	0.01	c0.03		c0.09	0.08		c0.08	0.12		0.03	c0.12	
v/s Ratio Perm												
v/c Ratio	0.15	0.31		0.64	0.56		0.64	0.22		0.45	0.26	
Uniform Delay, d1	35.6	36.1		34.6	34.2		34.8	10.6		38.4	14.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.2		6.7	3.2		6.6	0.3		3.4	0.4	
Delay (s)	36.1	37.3		41.3	37.4		41.5	10.9		41.7	14.5	
Level of Service	D	D		D	D		D	B		D	B	
Approach Delay (s)		37.1			39.2			17.5			17.0	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	84.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

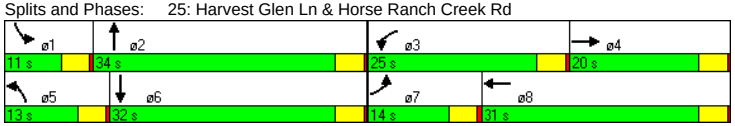
AM Horizon Year

25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	29	131	25	60	523	56	477
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	14.0	20.0	25.0	31.0	13.0	34.0	11.0	32.0
Total Split (%)	15.6%	22.2%	27.8%	34.4%	14.4%	37.8%	12.2%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.1	7.6	11.1	13.0	8.1	31.6	7.4	31.0
Actuated g/C Ratio	0.11	0.13	0.20	0.23	0.14	0.59	0.12	0.57
v/c Ratio	0.06	0.18	0.44	0.16	0.30	0.37	0.30	0.26
Control Delay	29.6	22.6	23.0	10.6	27.8	11.2	29.7	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	22.6	23.0	10.6	27.8	11.2	29.7	11.9
LOS	C	C	C	B	C	B	C	B
Approach Delay		24.1		19.0		12.5		13.7
Approach LOS		C		B		B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 54	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 48.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



AM Horizon Year

25: Harvest Glen Ln & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.961			0.909			0.962			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1790	0	1583	1693	0	1583	3405	0	1583	3518	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1790	0	1583	1693	0	1583	3405	0	1583	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			40			55			5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	10	29	10	131	25	38	60	523	176	56	477	20
Peak Hour Factor	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)	11	31	11	138	26	40	63	551	185	59	502	21
Lane Group Flow (vph)	11	42	0	138	66	0	63	736	0	59	523	0
v/c Ratio	0.06	0.18		0.44	0.16		0.30	0.37		0.30	0.26	
Control Delay	29.6	22.6		23.0	10.6		27.8	11.2		29.7	11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.6	22.6		23.0	10.6		27.8	11.2		29.7	11.9	
Queue Length 50th (ft)	1	3		14	2		7	30		6	21	
Queue Length 95th (ft)	20	41		106	39		64	188		62	142	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	281	473		552	729		266	2241		214	2250	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.09		0.25	0.09		0.24	0.33		0.28	0.23	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

25: Harvest Glen Ln & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.91		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1790		1583	1693		1583	3406		1583	3518	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1790		1583	1693		1583	3406		1583	3518	
Volume (vph)	10	29	10	131	25	38	60	523	176	56	477	20
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)	11	31	11	138	26	40	63	551	185	59	502	21
RTOR Reduction (vph)	0	10	0	0	33	0	0	28	0	0	3	0
Lane Group Flow (vph)	11	32	0	138	33	0	63	708	0	59	520	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.0	3.1		8.5	10.6		2.8	29.6		2.2	29.0	
Effective Green, g (s)	1.0	3.1		8.5	10.6		2.8	29.6		2.2	29.0	
Actuated g/C Ratio	0.02	0.05		0.14	0.18		0.05	0.50		0.04	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	27	93		227	302		75	1697		59	1718	
v/s Ratio Prot	0.01	c0.02		c0.09	0.02		c0.04	c0.21		0.04	0.15	
v/s Ratio Perm												
v/c Ratio	0.41	0.34		0.61	0.11		0.84	0.42		1.00	0.30	
Uniform Delay, d1	28.9	27.2		23.9	20.4		28.1	9.4		28.6	9.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.7	2.2		4.6	0.2		52.9	0.2		117.2	0.1	
Delay (s)	38.6	29.3		28.4	20.6		81.0	9.6		145.8	9.2	
Level of Service	D	C		C	C		F	A		F	A	
Approach Delay (s)		31.3			25.9			15.2			23.1	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year

26: Pardee South Loop & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	70	0	54	0	24	670	17	581
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	9.5	9.5	8.6	8.6	7.3	39.3	6.9	39.1
Actuated g/C Ratio	0.14	0.14	0.13	0.13	0.10	0.62	0.10	0.61
v/c Ratio	0.33	0.07	0.25	0.22	0.15	0.33	0.12	0.30
Control Delay	22.7	0.2	23.3	12.7	26.7	10.4	27.4	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	0.2	23.3	12.7	26.7	10.4	27.4	10.4
LOS	C	A	C	B	C	B	C	B
Approach Delay		14.8		17.8		10.9		10.9
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 63.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

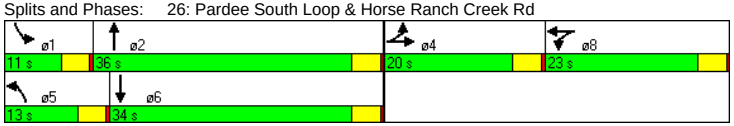
Maximum v/c Ratio: 0.33

Intersection Signal Delay: 11.6 — Intersection LOS: B

Intersection Capacity Utilization 40.0% — ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year

26: Pardee South Loop & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.879			0.996			0.993	
Flt Protected	0.950			0.950	0.990		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1540	0	1583	3525	0	1583	3514	0
Flt Permitted	0.950			0.950	0.990		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1540	0	1583	3525	0	1583	3514	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		450			41			4			6	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	70	0	38	54	0	39	24	670	20	17	581	30
Peak Hour Factor	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)	74	0	40	57	0	41	25	705	21	18	612	32
Lane Group Flow (vph)	74	40	0	47	51	0	25	726	0	18	644	0
v/c Ratio	0.33	0.07		0.25	0.22		0.15	0.33		0.12	0.30	
Control Delay	22.7	0.2		23.3	12.7		26.7	10.4		27.4	10.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.7	0.2		23.3	12.7		26.7	10.4		27.4	10.4	
Queue Length 50th (ft)	14	0		9	2		5	65		4	56	
Queue Length 95th (ft)	65	0		49	33		31	183		26	165	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	385	726		410	449		215	2467		173	2421	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.06		0.11	0.11		0.12	0.29		0.10	0.27	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.88		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1541		1583	3524		1583	3513	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1541		1583	3524		1583	3513	
Volume (vph)	70	0	38	54	0	39	24	670	20	17	581	30
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)	74	0	40	57	0	41	25	705	21	18	612	32
RTOR Reduction (vph)	0	36	0	0	37	0	0	2	0	0	3	0
Lane Group Flow (vph)	74	4	0	47	14	0	25	724	0	18	641	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.9	6.9		6.1	6.1		1.5	37.7		1.3	37.5	
Effective Green, g (s)	6.9	6.9		6.1	6.1		1.5	37.7		1.3	37.5	
Actuated g/C Ratio	0.10	0.10		0.09	0.09		0.02	0.55		0.02	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	161	161		135	138		35	1954		30	1937	
v/s Ratio Prot	c0.05	0.00		c0.03	0.01		c0.02	c0.21		0.01	0.18	
v/s Ratio Perm												
v/c Ratio	0.46	0.03		0.35	0.10		0.71	0.37		0.60	0.33	
Uniform Delay, d1	28.8	27.5		29.1	28.4		33.0	8.5		33.1	8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.1		1.6	0.3		51.0	0.1		28.3	0.1	
Delay (s)	30.9	27.6		30.6	28.7		84.0	8.6		61.4	8.5	
Level of Service	C	C		C	C		F	A		E	A	
Approach Delay (s)		29.7			29.7			11.1			9.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year

27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	150	698	230	0	671
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	158	735	242	0	706
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1209	488			977	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1209	488			977	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	70			100	
cM capacity (veh/h)	175	525			702	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	158	490	487	353	353
Volume Left	0	0	0	0	0
Volume Right	158	0	242	0	0
cSH	525	1700	1700	1700	1700
Volume to Capacity	0.30	0.29	0.29	0.21	0.21
Queue Length 95th (ft)	31	0	0	0	0
Control Delay (s)	14.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

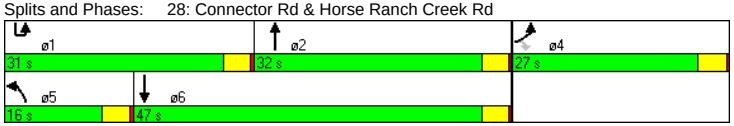
AM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT
Lane Configurations						
Volume (vph)	225	16	17	491	190	309
Turn Type		Perm	Prot		Prot	
Protected Phases	4		5	2	1	6
Permitted Phases		4				
Detector Phases	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	27.0	27.0	16.0	32.0	31.0	47.0
Total Split (%)	30.0%	30.0%	17.8%	35.6%	34.4%	52.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	None	Min
Act Effct Green (s)	8.9	8.9	6.2	19.2	11.0	30.1
Actuated g/C Ratio	0.19	0.19	0.12	0.42	0.23	0.66
v/c Ratio	0.41	0.06	0.10	0.35	0.54	0.32
Control Delay	19.2	10.3	24.9	14.5	21.5	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	10.3	24.9	14.5	21.5	3.2
LOS	B	B	C	B	C	A
Approach Delay	18.6			14.9		7.1
Approach LOS	B			B		A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 45.5	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 11.2	Intersection LOS: B
Intersection Capacity Utilization 42.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.917	
Flt Protected	0.950		0.950		0.950		
Satd. Flow (prot)	3072	1417	1583	3539	1583	3245	0
Flt Permitted	0.950		0.950		0.950		
Satd. Flow (perm)	3072	1417	1583	3539	1583	3245	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		17				405	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	225	16	17	491	190	309	385
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	17	18	517	200	325	405
Lane Group Flow (vph)	237	17	18	517	200	730	0
v/c Ratio	0.41	0.06	0.10	0.35	0.54	0.32	
Control Delay	19.2	10.3	24.9	14.5	21.5	3.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.2	10.3	24.9	14.5	21.5	3.2	
Queue Length 50th (ft)	25	0	4	55	41	14	
Queue Length 95th (ft)	67	14	22	122	113	65	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1162	546	324	1993	681	2525	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.03	0.06	0.26	0.29	0.29	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Horizon Year

28: Connector Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	0.92	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3072	1417	1583	3539	1583	3245	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3072	1417	1583	3539	1583	3245	
Volume (vph)	225	16	17	491	190	309	385
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	17	18	517	200	325	405
RTOR Reduction (vph)	0	14	0	0	0	168	0
Lane Group Flow (vph)	237	3	18	517	200	562	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	7.4	7.4	1.1	20.7	9.4	29.0	
Effective Green, g (s)	7.4	7.4	1.1	20.7	9.4	29.0	
Actuated g/C Ratio	0.15	0.15	0.02	0.42	0.19	0.59	
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)	459	212	35	1480	301	1901	
v/s Ratio Prot	c0.08		0.01	c0.15	c0.13	0.17	
v/s Ratio Perm		0.00					
v/c Ratio	0.52	0.01	0.51	0.35	0.66	0.30	
Uniform Delay, d1	19.4	17.9	23.9	9.8	18.6	5.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.0	12.2	0.1	5.4	0.1	
Delay (s)	20.4	18.0	36.1	10.0	24.0	5.2	
Level of Service	C	B	D	A	C	A	
Approach Delay (s)	20.2			10.8		9.3	
Approach LOS	C			B		A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

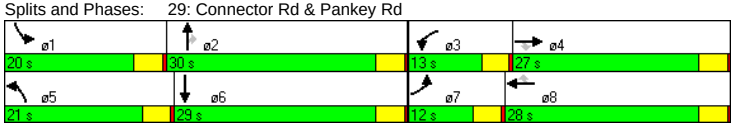
AM Horizon Year

29: Connector Rd & Pankey Rd — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	60	118	210	37	273	180	160	310	23	134	40
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	12.0	27.0	27.0	13.0	28.0	28.0	21.0	30.0	30.0	20.0	29.0
Total Split (%)	13.3%	30.0%	30.0%	14.4%	31.1%	31.1%	23.3%	33.3%	33.3%	22.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	7.7	16.3	16.3	7.6	14.6	14.6	11.7	24.7	24.7	10.9	24.0
Actuated g/C Ratio	0.12	0.26	0.26	0.12	0.24	0.24	0.19	0.41	0.41	0.18	0.40
v/c Ratio	0.33	0.37	0.36	0.21	0.65	0.40	0.56	0.42	0.04	0.50	0.09
Control Delay	38.7	22.2	7.2	37.5	31.7	7.1	35.7	24.7	10.2	35.5	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	22.2	7.2	37.5	31.7	7.1	35.7	24.7	10.2	35.5	17.2
LOS	D	C	A	D	C	A	D	C	B	D	B
Approach Delay		18.3			23.1			27.6			29.8
Approach LOS		B			C			C			C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 59.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 56.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



LOS Engineering

AM Horizon Year
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.959	0.850			0.850			0.850		0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1697	1346	1583	1863	1417	1583	1863	1417	1583	1770	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1697	1346	1583	1863	1417	1583	1863	1417	1583	1770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20	174			189			24		21	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	60	118	210	37	273	180	160	310	23	134	40	20
Peak Hour Factor	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)	63	124	221	39	287	189	168	326	24	141	42	21
Lane Group Flow (vph)	63	171	174	39	287	189	168	326	24	141	63	0
v/c Ratio	0.33	0.37	0.36	0.21	0.65	0.40	0.56	0.42	0.04	0.50	0.09	
Control Delay	38.7	22.2	7.2	37.5	31.7	7.1	35.7	24.7	10.2	35.5	17.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	38.7	22.2	7.2	37.5	31.7	7.1	35.7	24.7	10.2	35.5	17.2	
Queue Length 50th (ft)	24	41	0	15	108	0	64	122	0	54	14	
Queue Length 95th (ft)	75	135	51	52	224	50	154	248	18	133	48	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	221	638	605	238	668	629	437	899	696	414	847	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.29	0.27	0.29	0.16	0.43	0.30	0.38	0.36	0.03	0.34	0.07	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
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)	1583	1697	1346	1583	1863	1417	1583	1863	1417	1583	1770	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1697	1346	1583	1863	1417	1583	1863	1417	1583	1770	
Volume (vph)	60	118	210	37	273	180	160	310	23	134	40	20
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)	63	124	221	39	287	189	168	326	24	141	42	21
RTOR Reduction (vph)	0	16	136	0	0	152	0	0	15	0	14	0
Lane Group Flow (vph)	63	155	38	39	287	37	168	326	9	141	49	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.7	13.7	13.7	2.5	12.5	12.5	9.2	22.6	22.6	8.5	21.9	
Effective Green, g (s)	3.7	13.7	13.7	2.5	12.5	12.5	9.2	22.6	22.6	8.5	21.9	
Actuated g/C Ratio	0.06	0.22	0.22	0.04	0.20	0.20	0.15	0.36	0.36	0.13	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	93	367	291	63	368	280	230	665	506	213	612	
v/s Ratio Prot	c0.04	0.09		0.02	c0.15		c0.11	c0.18		0.09	0.03	
v/s Ratio Perm			0.03			0.03			0.01			
v/c Ratio	0.68	0.42	0.13	0.62	0.78	0.13	0.73	0.49	0.02	0.66	0.08	
Uniform Delay, d1	29.2	21.4	20.0	29.9	24.1	20.9	25.9	15.9	13.2	26.0	13.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.8	0.8	0.2	16.7	10.0	0.2	11.3	0.6	0.0	7.5	0.1	
Delay (s)	47.0	22.2	20.2	46.7	34.1	21.2	37.2	16.4	13.2	33.5	14.0	
Level of Service	D	C	C	D	C	C	D	B	B	C	B	
Approach Delay (s)		25.2			30.3			23.0			27.5	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	63.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Horizon Year
1: Pala Rd (SR-76) & Via Monserate — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	60	2093	1594	120	60	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	2203	1678	126	63	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1804				2969	902
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1804				2969	902
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	81				0	89
cM capacity (veh/h)	338				9	281

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	63	1102	1102	1119	686	32
Volume Left	63	0	0	0	0	0
Volume Right	0	0	0	0	126	32
cSH	338	1700	1700	1700	1700	281
Volume to Capacity	0.19	0.65	0.65	0.66	0.40	0.11
Queue Length 95th (ft)	17	0	0	0	0	9
Control Delay (s)	18.1	0.0	0.0	0.0	0.0	19.4
Lane LOS	C					C
Approach Delay (s)	0.5			0.0		Err
Approach LOS						F

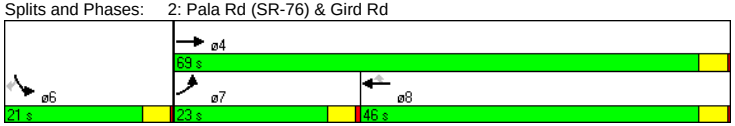
Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

PM Horizon Year
2: Pala Rd (SR-76) & Gird Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	230	1733	1334	130	70	90
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	23.0	69.0	46.0	46.0	21.0	21.0
Total Split (%)	25.6%	76.7%	51.1%	51.1%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	14.8	52.9	33.8	33.8	9.0	9.0
Actuated g/C Ratio	0.21	0.75	0.48	0.48	0.13	0.13
v/c Ratio	0.73	0.69	0.83	0.20	0.37	0.36
Control Delay	42.3	6.0	21.2	10.4	37.6	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	6.0	21.2	10.4	37.6	12.1
LOS	D	A	C	B	D	B
Approach Delay		10.3	20.2		23.3	
Approach LOS		B	C		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70.4	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 14.9	Intersection LOS: B
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



PM Horizon Year
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				25		95
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	230	1733	1334	130	70	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	1824	1404	137	74	95
Lane Group Flow (vph)	242	1824	1404	137	74	95
v/c Ratio	0.73	0.69	0.83	0.20	0.37	0.36
Control Delay	42.3	6.0	21.2	10.4	37.6	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	6.0	21.2	10.4	37.6	12.1
Queue Length 50th (ft)	107	151	275	27	34	0
Queue Length 95th (ft)	#218	269	417	66	77	42
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	416	2806	1917	779	356	392
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.65	0.73	0.18	0.21	0.24

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Volume (vph)	230	1733	1334	130	70	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	1824	1404	137	74	95
RTOR Reduction (vph)	0	0	0	13	0	83
Lane Group Flow (vph)	242	1824	1404	124	74	12
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	14.8	52.9	34.1	34.1	9.0	9.0
Effective Green, g (s)	14.8	52.9	34.1	34.1	9.0	9.0
Actuated g/C Ratio	0.21	0.76	0.49	0.49	0.13	0.13
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)	335	2678	1726	691	204	182
v/s Ratio Prot	0.15	c0.52	c0.40		c0.05	
v/s Ratio Perm				0.09		0.01
v/c Ratio	0.72	0.68	0.81	0.18	0.36	0.07
Uniform Delay, d1	25.6	4.3	15.2	10.0	27.8	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.5	0.7	3.1	0.1	1.1	0.2
Delay (s)	33.1	5.0	18.3	10.2	28.9	26.9
Level of Service	C	A	B	B	C	C
Approach Delay (s)		8.3	17.5		27.8	
Approach LOS		A	B		C	

Intersection Summary

HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	69.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year

3: Pala Rd (SR-76) & Sage Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	20	1573	1594	20	20	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	1656	1678	21	21	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1699				2558	849
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1699				2558	849
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				0	93
cM capacity (veh/h)	371				20	304

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	21	828	828	1119	580	21
Volume Left	21	0	0	0	0	0
Volume Right	0	0	0	0	21	21
cSH	371	1700	1700	1700	1700	304
Volume to Capacity	0.06	0.49	0.49	0.66	0.34	0.07
Queue Length 95th (ft)	4	0	0	0	0	6
Control Delay (s)	15.3	0.0	0.0	0.0	0.0	17.7
Lane LOS	C					C
Approach Delay (s)	0.2			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

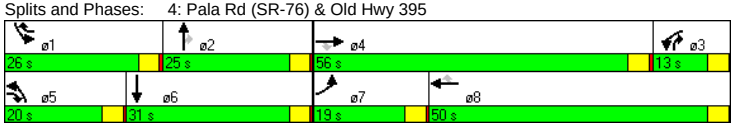
PM Horizon Year

4: Pala Rd (SR-76) & Old Hwy 395 — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	114	1089	150	110	1085	380	230	289	150	350	215
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	5	3	8	1	5	2	3	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	19.0	56.0	20.0	13.0	50.0	26.0	20.0	25.0	13.0	26.0	31.0
Total Split (%)	15.8%	46.7%	16.7%	10.8%	41.7%	21.7%	16.7%	20.8%	10.8%	21.7%	25.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	Min	None	None	Min	Min	Min	None	Min	Min
Act Effct Green (s)	12.3	42.6	58.8	10.8	41.0	63.4	16.2	23.6	34.4	18.3	25.7
Actuated g/C Ratio	0.11	0.38	0.53	0.10	0.37	0.57	0.15	0.21	0.31	0.16	0.23
v/c Ratio	0.69	0.85	0.19	0.76	0.88	0.45	1.05	0.77	0.34	0.73	0.93
Control Delay	69.3	38.0	1.6	81.4	41.9	8.0	121.5	58.6	16.3	54.0	69.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	38.0	1.6	81.4	41.9	8.0	121.5	58.6	16.3	54.0	69.3
LOS	E	D	A	F	D	A	F	E	B	D	E
Approach Delay		36.6			36.5			70.7			61.9
Approach LOS		D			D			E			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 46.1	Intersection LOS: D
Intersection Capacity Utilization 85.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

PM Horizon Year
4: Pala Rd (SR-76) & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	1		1	2		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850			0.850		0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1744	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			195			43		29	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	114	1089	150	110	1085	380	230	289	150	350	215	159
Peak Hour Factor	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)	120	1146	158	116	1142	400	242	304	158	368	226	167
Lane Group Flow (vph)	120	1146	158	116	1142	400	242	304	158	368	393	0
v/c Ratio	0.69	0.85	0.19	0.76	0.88	0.45	1.05	0.77	0.34	0.73	0.93	
Control Delay	69.3	38.0	1.6	81.4	41.9	8.0	121.5	58.6	16.3	54.0	69.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	69.3	38.0	1.6	81.4	41.9	8.0	121.5	58.6	16.3	54.0	69.3	
Queue Length 50th (ft)	88	407	0	86	414	74	~213	225	42	137	276	
Queue Length 95th (ft)	155	468	18	#214	512	138	#384	#406	89	190	#480	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	210	1530	822	153	1404	882	230	394	467	591	442	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.57	0.75	0.19	0.76	0.81	0.45	1.05	0.77	0.34	0.62	0.89	

Intersection Summary
Area Type: Other
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

PM Horizon Year
4: Pala Rd (SR-76) & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
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)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1744	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1744	
Volume (vph)	114	1089	150	110	1085	380	230	289	150	350	215	159
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)	120	1146	158	116	1142	400	242	304	158	368	226	167
RTOR Reduction (vph)	0	0	75	0	0	91	0	0	30	0	22	0
Lane Group Flow (vph)	120	1146	83	116	1142	309	242	304	128	368	371	0
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	12.3	42.6	58.8	10.8	41.1	59.4	16.2	23.6	34.4	18.3	25.7	
Effective Green, g (s)	12.3	42.6	58.8	10.8	41.1	59.4	16.2	23.6	34.4	18.3	25.7	
Actuated g/C Ratio	0.11	0.38	0.53	0.10	0.37	0.53	0.15	0.21	0.31	0.16	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	175	1355	749	154	1307	807	230	395	438	505	403	
v/s Ratio Prot	0.08	c0.32	0.02	0.07	c0.32	0.06	c0.15	0.16	0.03	0.12	c0.21	
v/s Ratio Perm			0.04			0.16			0.06			
v/c Ratio	0.69	0.85	0.11	0.75	0.87	0.38	1.05	0.77	0.29	0.73	0.92	
Uniform Delay, d1	47.6	31.4	13.2	49.0	32.7	15.2	47.5	41.3	29.2	44.1	41.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.6	5.1	0.1	18.6	6.7	0.3	73.7	8.8	0.4	5.2	25.6	
Delay (s)	58.2	36.4	13.2	67.6	39.4	15.5	121.3	50.0	29.6	49.4	67.4	
Level of Service	E	D	B	E	D	B	F	D	C	D	E	
Approach Delay (s)		35.7			35.6			69.9			58.7	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM Average Control Delay	44.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	111.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

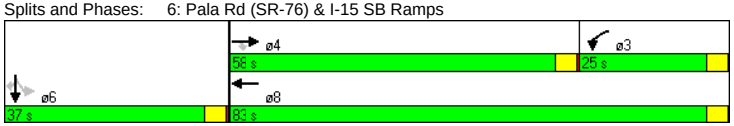
LOS Engineering

PM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps — Timings

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	1289	300	373	1044	289	20	530
Turn Type		Perm	Prot		Perm		Perm
Protected Phases	4		3	8		6	
Permitted Phases		4			6		6
Detector Phases	4	4	3	8	6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	58.0	58.0	25.0	83.0	37.0	37.0	37.0
Total Split (%)	48.3%	48.3%	20.8%	69.2%	30.8%	30.8%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	52.0	52.0	18.5	74.5	37.5	37.5	37.5
Actuated g/C Ratio	0.43	0.43	0.15	0.62	0.31	0.31	0.31
v/c Ratio	0.88	0.41	0.83	0.50	0.54	0.63	0.57
Control Delay	39.0	5.8	69.3	17.0	41.3	30.1	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	5.8	69.3	17.0	41.3	30.1	26.1
LOS	D	A	E	B	D	C	C
Approach Delay	32.7			30.8		32.0	
Approach LOS	C			C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 31.9	Intersection LOS: C
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



PM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	2		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.881	0.850
Flt Protected				0.950						0.950	0.993	
Satd. Flow (prot)	0	3539	1417	3072	3539	0	0	0	0	1504	1483	1346
Flt Permitted				0.950						0.950	0.993	
Satd. Flow (perm)	0	3539	1417	3072	3539	0	0	0	0	1504	1483	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266								120	120
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	1289	300	373	1044	0	0	0	0	289	20	530
Peak Hour Factor	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)	0	1357	316	393	1099	0	0	0	0	304	21	558
Lane Group Flow (vph)	0	1357	316	393	1099	0	0	0	0	253	345	285
v/c Ratio		0.88	0.41	0.83	0.50					0.54	0.63	0.57
Control Delay		39.0	5.8	69.3	17.0					41.3	30.1	26.1
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		39.0	5.8	69.3	17.0					41.3	30.1	26.1
Queue Length 50th (ft)		463	21	160	436					183	176	118
Queue Length 95th (ft)		584	81	m189	504					275	297	221
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		1616	792	538	2347					477	552	509
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.84	0.40	0.73	0.47					0.53	0.63	0.56

Intersection Summary	
Area Type:	Other
m Volume for 95th percentile queue is metered by upstream signal.	

PM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.88	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (prot)		3539	1417	3072	3539					1504	1483	1346
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (perm)		3539	1417	3072	3539					1504	1483	1346
Volume (vph)	0	1289	300	373	1044	0	0	0	0	289	20	530
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)	0	1357	316	393	1099	0	0	0	0	304	21	558
RTOR Reduction (vph)	0	0	151	0	0	0	0	0	0	0	83	83
Lane Group Flow (vph)	0	1357	165	393	1099	0	0	0	0	253	263	203
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		52.0	52.0	18.5	74.5					37.5	37.5	37.5
Effective Green, g (s)		52.0	52.0	18.5	74.5					37.5	37.5	37.5
Actuated g/C Ratio		0.43	0.43	0.15	0.62					0.31	0.31	0.31
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1534	614	474	2197					470	463	421
v/s Ratio Prot		c0.38		c0.13	0.31							
v/s Ratio Perm			0.12							0.17	0.18	0.15
v/c Ratio		0.88	0.27	0.83	0.50					0.54	0.57	0.48
Uniform Delay, d1		31.2	21.8	49.2	12.5					34.1	34.5	33.4
Progression Factor		1.00	1.00	1.21	1.35					1.00	1.00	1.00
Incremental Delay, d2		6.5	0.2	7.3	0.1					4.4	5.0	3.9
Delay (s)		37.7	22.0	66.9	17.0					38.5	39.4	37.3
Level of Service		D	C	E	B					D	D	D
Approach Delay (s)		34.7			30.1			0.0			38.5	
Approach LOS		C			C			A			D	

Intersection Summary			
HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

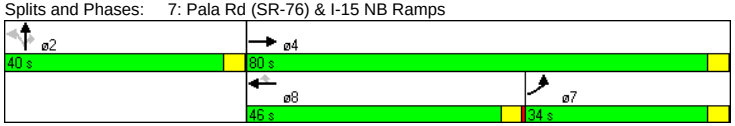
PM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Volume (vph)	600	979	968	346	450	20	387
Turn Type	Prot			Perm	Perm		Perm
Protected Phases	7	4	8			2	
Permitted Phases				8	2		2
Detector Phases	7	4	8	8	2	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	34.0	80.0	46.0	46.0	40.0	40.0	40.0
Total Split (%)	28.3%	66.7%	38.3%	38.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	28.6	72.7	40.0	40.0	39.3	39.3	39.3
Actuated g/C Ratio	0.24	0.61	0.33	0.33	0.33	0.33	0.33
v/c Ratio	0.86	0.48	0.86	0.68	0.56	0.61	0.58
Control Delay	65.8	27.0	45.8	31.8	40.2	39.4	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.8	27.0	45.8	31.8	40.2	39.4	25.3
LOS	E	C	D	C	D	D	C
Approach Delay		41.7	42.1			34.9	
Approach LOS		D	D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 40.3	Intersection LOS: D
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



LOS Engineering

PM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.91	0.95	1.00	1.00	1.00
Frt						0.850		0.952	0.850			
Flt Protected	0.950						0.950	0.970				
Satd. Flow (prot)	3072	3539	0	0	3539	1417	1504	1565	1346	0	0	0
Flt Permitted	0.950						0.950	0.970				
Satd. Flow (perm)	3072	3539	0	0	3539	1417	1504	1565	1346	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						94		20	127			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	600	979	0	0	968	346	450	20	387	0	0	0
Peak Hour Factor	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)	632	1031	0	0	1019	364	474	21	407	0	0	0
Lane Group Flow (vph)	632	1031	0	0	1019	364	275	323	304	0	0	0
v/c Ratio	0.86	0.48			0.86	0.68	0.56	0.61	0.58			
Control Delay	65.8	27.0			45.8	31.8	40.2	39.4	25.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	65.8	27.0			45.8	31.8	40.2	39.4	25.3			
Queue Length 50th (ft)	198	251			371	174	203	239	130			
Queue Length 95th (ft)	m263	m342			463	288	291	342	229			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	786	2278			1255	563	509	543	540			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.80	0.45			0.81	0.65	0.54	0.59	0.56			

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frt	1.00	1.00			1.00	0.85	1.00	0.95	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (prot)	3072	3539			3539	1417	1504	1566	1346			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (perm)	3072	3539			3539	1417	1504	1566	1346			
Volume (vph)	600	979	0	0	968	346	450	20	387	0	0	0
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)	632	1031	0	0	1019	364	474	21	407	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	63	0	13	85	0	0	0
Lane Group Flow (vph)	632	1031	0	0	1019	301	275	310	219	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	28.7	72.7			40.0	40.0	39.3	39.3	39.3			
Effective Green, g (s)	28.7	72.7			40.0	40.0	39.3	39.3	39.3			
Actuated g/C Ratio	0.24	0.61			0.33	0.33	0.33	0.33	0.33			
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)	735	2144			1180	472	493	513	441			
v/s Ratio Prot	c0.21	0.29			c0.29							
v/s Ratio Perm						0.21	0.18	0.20	0.16			
v/c Ratio	0.86	0.48			0.86	0.64	0.56	0.60	0.50			
Uniform Delay, d1	43.7	13.2			37.4	33.9	33.2	33.8	32.4			
Progression Factor	1.34	2.05			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	5.6	0.1			6.7	2.8	4.5	5.2	3.9			
Delay (s)	64.2	27.0			44.2	36.7	37.7	39.0	36.3			
Level of Service	E	C			D	D	D	D	D			
Approach Delay (s)		41.2			42.2			37.7			0.0	
Approach LOS		D			D			D			A	

Intersection Summary

HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

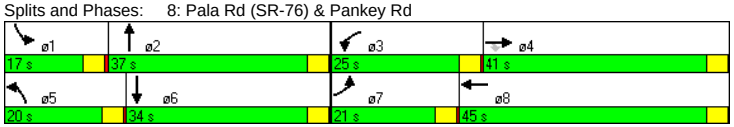
PM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	155	871	340	188	776	330	399	120	461
Turn Type	Prot		Perm	Prot		Prot		Prot	
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phases	7	4	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	21.0	41.0	41.0	25.0	45.0	20.0	37.0	17.0	34.0
Total Split (%)	17.5%	34.2%	34.2%	20.8%	37.5%	16.7%	30.8%	14.2%	28.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	14.3	31.7	31.7	16.9	34.3	14.8	31.3	11.4	24.6
Actuated g/C Ratio	0.14	0.30	0.30	0.16	0.33	0.14	0.30	0.11	0.23
v/c Ratio	0.76	0.86	0.53	0.78	0.80	0.80	0.63	0.75	0.84
Control Delay	69.5	44.6	7.0	66.1	38.4	61.3	32.3	75.9	46.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.5	44.6	7.0	66.1	38.4	61.3	32.3	75.9	46.5
LOS	E	D	A	E	D	E	C	E	D
Approach Delay		38.1			43.3		42.1		51.0
Approach LOS		D			D		D		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 42.8	Intersection LOS: D
Intersection Capacity Utilization 79.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Pala Rd (SR-76) & Pankey Rd



PM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.984			0.943			0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3483	0	3072	3337	0	1583	3373	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3483	0	3072	3337	0	1583	3373	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			348		11			108			58	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2232			2833			991			1488	
Travel Time (s)		50.7			64.4			22.5			33.8	
Volume (vph)	155	871	340	188	776	90	330	399	245	120	461	208
Peak Hour Factor	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)	163	917	358	198	817	95	347	420	258	126	485	219
Lane Group Flow (vph)	163	917	358	198	912	0	347	678	0	126	704	0
v/c Ratio	0.76	0.86	0.53	0.78	0.80		0.80	0.63		0.75	0.84	
Control Delay	69.5	44.6	7.0	66.1	38.4		61.3	32.3		75.9	46.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	69.5	44.6	7.0	66.1	38.4		61.3	32.3		75.9	46.5	
Queue Length 50th (ft)	120	338	5	144	319		134	206		94	246	
Queue Length 95th (ft)	#222	432	80	#249	405		#215	277		#191	323	
Internal Link Dist (ft)		2152			2753			911			1408	
Turn Bay Length (ft)												
Base Capacity (vph)	259	1214	715	315	1311		482	1139		194	983	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.63	0.76	0.50	0.63	0.70		0.72	0.60		0.65	0.72	

Intersection Summary	
Area Type:	Other
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

PM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3539	1417	1583	3484		3072	3337		1583	3374	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3484		3072	3337		1583	3374	
Volume (vph)	155	871	340	188	776	90	330	399	245	120	461	208
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)	163	917	358	198	817	95	347	420	258	126	485	219
RTOR Reduction (vph)	0	0	243	0	7	0	0	76	0	0	44	0
Lane Group Flow (vph)	163	917	115	198	905	0	347	602	0	126	660	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	14.3	31.7	31.7	16.9	34.3		14.8	31.3		9.3	25.8	
Effective Green, g (s)	14.3	31.7	31.7	16.9	34.3		14.8	31.3		9.3	25.8	
Actuated g/C Ratio	0.14	0.30	0.30	0.16	0.33		0.14	0.30		0.09	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	215	1066	427	254	1136		432	993		140	827	
v/s Ratio Prot	0.10	c0.26		c0.13	c0.26		c0.11	0.18		0.08	c0.20	
v/s Ratio Perm			0.08									
v/c Ratio	0.76	0.86	0.27	0.78	0.80		0.80	0.61		0.90	0.80	
Uniform Delay, d1	43.8	34.7	27.9	42.4	32.3		43.8	31.7		47.5	37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.2	7.2	0.3	14.0	4.0		10.4	1.1		47.4	5.4	
Delay (s)	57.9	41.9	28.3	56.4	36.2		54.1	32.7		94.8	42.7	
Level of Service	E	D	C	E	D		D	C		F	D	
Approach Delay (s)		40.3			39.8			40.0			50.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	105.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

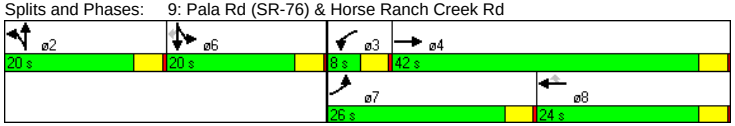
PM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	546	750	740	103	79	0	314		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	26.0	42.0	24.0	24.0	20.0	20.0	20.0	20.0	8.0
Total Split (%)	28.9%	46.7%	26.7%	26.7%	22.2%	22.2%	22.2%	22%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	17.3	41.1	19.8	19.8	8.6	8.6	8.6		
Actuated g/C Ratio	0.26	0.61	0.29	0.29	0.13	0.13	0.13		
v/c Ratio	0.73	0.37	0.75	0.22	0.29	0.57	0.54		
Control Delay	29.3	7.4	28.8	6.5	31.6	15.2	11.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	29.3	7.4	28.8	6.5	31.6	15.2	11.8		
LOS	C	A	C	A	C	B	B		
Approach Delay		16.7	26.1			15.9			
Approach LOS		B	C			B			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 67.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.873	0.850
Flt Protected	0.950									0.950	0.993	
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1469	1346
Flt Permitted	0.950									0.950	0.993	
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1469	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						108					158	173
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	546	750	0	0	740	103	0	0	0	79	0	314
Peak Hour Factor	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)	575	789	0	0	779	108	0	0	0	83	0	331
Lane Group Flow (vph)	575	789	0	0	779	108	0	0	0	55	186	173
v/c Ratio	0.73	0.37			0.75	0.22				0.29	0.57	0.54
Control Delay	29.3	7.4			28.8	6.5				31.6	15.2	11.8
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	29.3	7.4			28.8	6.5				31.6	15.2	11.8
Queue Length 50th (ft)	109	71			149	0				22	12	0
Queue Length 95th (ft)	181	132			#287	37				56	71	52
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	942	2179			1055	498				324	440	426
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.61	0.36			0.74	0.22				0.17	0.42	0.41

Intersection Summary
Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

PM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.87	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.99	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1468	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	0.99	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1468	1346
Volume (vph)	546	750	0	0	740	103	0	0	0	79	0	314
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)	575	789	0	0	779	108	0	0	0	83	0	331
RTOR Reduction (vph)	0	0	0	0	0	76	0	0	0	0	138	151
Lane Group Flow (vph)	575	789	0	0	779	32	0	0	0	55	48	22
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	17.2	41.1			19.9	19.9				8.6	8.6	8.6
Effective Green, g (s)	17.2	41.1			19.9	19.9				8.6	8.6	8.6
Actuated g/C Ratio	0.26	0.61			0.30	0.30				0.13	0.13	0.13
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)	785	2161			1046	419				192	188	172
v/s Ratio Prot	c0.19	0.22			c0.22					c0.04	0.03	
v/s Ratio Perm						0.02						0.02
v/c Ratio	0.73	0.37			0.74	0.08				0.29	0.26	0.13
Uniform Delay, d1	22.9	6.6			21.4	17.1				26.6	26.5	26.0
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	3.5	0.1			2.9	0.1				0.8	0.7	0.3
Delay (s)	26.5	6.7			24.3	17.2				27.4	27.2	26.4
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		15.0			23.5			0.0			26.9	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	21.6
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

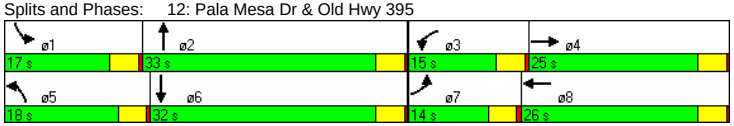
PM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	150	149	161	185	120	820	195	490
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	14.0	25.0	15.0	26.0	18.0	33.0	17.0	32.0
Total Split (%)	15.6%	27.8%	16.7%	28.9%	20.0%	36.7%	18.9%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	10.0	20.7	10.9	21.6	11.4	28.2	12.9	29.6
Actuated g/C Ratio	0.11	0.23	0.12	0.24	0.13	0.32	0.15	0.33
v/c Ratio	0.88	0.82	0.87	0.96	0.62	0.92	0.89	0.52
Control Delay	84.5	42.4	78.1	61.8	49.9	43.0	76.5	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.5	42.4	78.1	61.8	49.9	43.0	76.5	25.3
LOS	F	D	E	E	D	D	E	C
Approach Delay		55.0		66.3		43.8		38.2
Approach LOS		E		E		D		D

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 88.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 48.7 — Intersection LOS: D
Intersection Capacity Utilization 86.7% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 12: Pala Mesa Dr & Old Hwy 395



PM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	0		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.914			0.916			0.976			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1703	0	1583	1706	0	1583	3454	0	1583	3458	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1703	0	1583	1706	0	1583	3454	0	1583	3458	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			68			26			24	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3628			1500			4464			5461	
Travel Time (s)		82.5			34.1			101.5			124.1	
Volume (vph)	150	149	200	161	185	238	120	820	157	195	490	90
Peak Hour Factor	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)	158	157	211	169	195	251	126	863	165	205	516	95
Lane Group Flow (vph)	158	368	0	169	446	0	126	1028	0	205	611	0
v/c Ratio	0.88	0.82		0.87	0.96		0.62	0.92		0.89	0.52	
Control Delay	84.5	42.4		78.1	61.8		49.9	43.0		76.5	25.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	84.5	42.4		78.1	61.8		49.9	43.0		76.5	25.3	
Queue Length 50th (ft)	90	163		96	217		68	285		116	140	
Queue Length 95th (ft)	#206	#309		#212	#407		124	#411		#245	199	
Internal Link Dist (ft)		3548			1420			4384			5381	
Turn Bay Length (ft)							150			200		
Base Capacity (vph)	179	455		196	472		243	1137		232	1171	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.88	0.81		0.86	0.94		0.52	0.90		0.88	0.52	

Intersection Summary

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

PM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.92		1.00	0.98		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)	1583	1703		1583	1705		1583	3454		1583	3457	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1703		1583	1705		1583	3454		1583	3457	
Volume (vph)	150	149	200	161	185	238	120	820	157	195	490	90
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)	158	157	211	169	195	251	126	863	165	205	516	95
RTOR Reduction (vph)	0	54	0	0	51	0	0	18	0	0	16	0
Lane Group Flow (vph)	158	314	0	169	395	0	126	1010	0	205	595	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	10.0	20.7		10.9	21.6		11.4	28.2		12.9	29.7	
Effective Green, g (s)	10.0	20.7		10.9	21.6		11.4	28.2		12.9	29.7	
Actuated g/C Ratio	0.11	0.23		0.12	0.24		0.13	0.32		0.15	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	178	397		195	415		203	1098		230	1158	
v/s Ratio Prot	0.10	0.18		c0.11	c0.23		0.08	c0.29		c0.13	0.17	
v/s Ratio Perm												
v/c Ratio	0.89	0.79		0.87	0.95		0.62	0.92		0.89	0.51	
Uniform Delay, d1	38.8	32.0		38.2	33.0		36.6	29.2		37.2	23.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	37.2	10.3		30.8	31.7		5.8	12.3		32.0	0.4	
Delay (s)	76.0	42.3		69.0	64.7		42.4	41.4		69.2	24.1	
Level of Service	E	D		E	E		D	D		E	C	
Approach Delay (s)		52.4			65.9			41.5			35.4	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	46.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

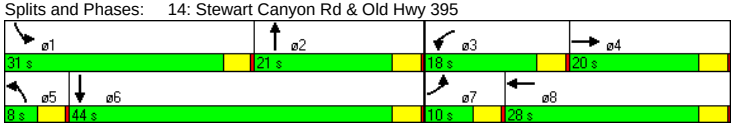
LOS Engineering

PM Horizon Year
14: Stewart Canyon Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	30	118	10	70	720	379	700
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	10.0	20.0	18.0	28.0	8.0	21.0	31.0	44.0
Total Split (%)	11.1%	22.2%	20.0%	31.1%	8.9%	23.3%	34.4%	48.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.9	7.4	10.4	15.6	4.2	17.9	21.9	35.5
Actuated g/C Ratio	0.08	0.10	0.14	0.22	0.06	0.25	0.31	0.50
v/c Ratio	0.17	0.35	0.55	0.57	0.80	0.89	0.82	0.48
Control Delay	40.2	22.9	41.1	8.2	92.1	43.9	39.8	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	22.9	41.1	8.2	92.1	43.9	39.8	13.6
LOS	D	C	D	A	F	D	D	B
Approach Delay		26.7		16.9		48.1		22.1
Approach LOS		C		B		D		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 29.7	Intersection LOS: C
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Stewart Canyon Rd & Old Hwy 395



LOS Engineering

PM Horizon Year
14: Stewart Canyon Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	200		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.855			0.995			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1704	0	1583	1593	0	1583	3522	0	1583	3479	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1704	0	1583	1593	0	1583	3522	0	1583	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			334			3			20	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1302			7424			5461			3410	
Travel Time (s)		29.6			168.7			124.1			77.5	
Volume (vph)	20	30	40	118	10	317	70	720	25	379	700	90
Peak Hour Factor	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)	21	32	42	124	11	334	74	758	26	399	737	95
Lane Group Flow (vph)	21	74	0	124	345	0	74	784	0	399	832	0
v/c Ratio	0.17	0.35		0.55	0.57		0.80	0.89		0.82	0.48	
Control Delay	40.2	22.9		41.1	8.2		92.1	43.9		39.8	13.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.2	22.9		41.1	8.2		92.1	43.9		39.8	13.6	
Queue Length 50th (ft)	10	14		56	4		36	~196		167	124	
Queue Length 95th (ft)	33	54		114	74		#125	#368		#335	201	
Internal Link Dist (ft)		1222			7344			5381			3330	
Turn Bay Length (ft)				200			100			100		
Base Capacity (vph)	126	384		292	721		93	883		569	1861	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.19		0.42	0.48		0.80	0.89		0.70	0.45	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

LOS Engineering

PM Horizon Year
14: Stewart Canyon Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.85		1.00	1.00		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)	1583	1704		1583	1592		1583	3522		1583	3479	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1704		1583	1592		1583	3522		1583	3479	
Volume (vph)	20	30	40	118	10	317	70	720	25	379	700	90
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)	21	32	42	124	11	334	74	758	26	399	737	95
RTOR Reduction (vph)	0	37	0	0	263	0	0	2	0	0	10	0
Lane Group Flow (vph)	21	37	0	124	82	0	74	782	0	399	822	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.1	9.0		8.7	15.6		4.2	17.8		21.9	35.5	
Effective Green, g (s)	2.1	9.0		8.7	15.6		4.2	17.8		21.9	35.5	
Actuated g/C Ratio	0.03	0.12		0.12	0.21		0.06	0.24		0.30	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	45	209		188	338		91	854		472	1683	
v/s Ratio Prot	0.01	0.02		c0.08	c0.05		0.05	c0.22		c0.25	0.24	
v/s Ratio Perm												
v/c Ratio	0.47	0.18		0.66	0.24		0.81	0.92		0.85	0.49	
Uniform Delay, d1	35.1	28.9		30.9	24.0		34.2	27.1		24.2	12.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.5	0.4		8.1	0.4		40.5	14.2		13.1	0.2	
Delay (s)	42.6	29.3		39.0	24.4		74.7	41.3		37.2	13.0	
Level of Service	D	C		D	C		E	D		D	B	
Approach Delay (s)		32.2			28.2			44.2			20.9	
Approach LOS		C			C			D			C	

Intersection Summary

HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

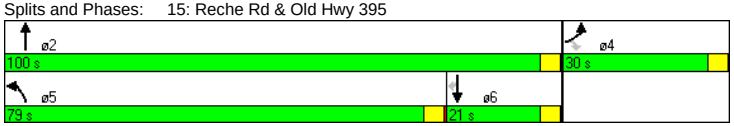
LOS Engineering

PM Horizon Year
15: Reche Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	300	239	871	306	140	400
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	79.0	100.0	21.0	21.0
Total Split (%)	23.1%	23.1%	60.8%	76.9%	16.2%	16.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	26.0	26.0	75.1	91.5	12.4	12.4
Actuated g/C Ratio	0.21	0.21	0.60	0.73	0.10	0.10
v/c Ratio	0.96	0.51	0.97	0.12	0.42	0.87
Control Delay	90.7	9.2	47.9	5.2	56.5	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.7	9.2	47.9	5.2	56.5	27.6
LOS	F	A	D	A	E	C
Approach Delay	54.5			36.8	35.1	
Approach LOS	D			D	D	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 125.5	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 40.6	Intersection LOS: D
Intersection Capacity Utilization 88.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Reche Rd & Old Hwy 395



PM Horizon Year
15: Reche Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Storage Length (ft)	0	0	150			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		252				380
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	2635			3410	4960	
Travel Time (s)	59.9			77.5	112.7	
Volume (vph)	300	239	871	306	140	400
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	252	917	322	147	421
Lane Group Flow (vph)	316	252	917	322	147	421
v/c Ratio	0.96	0.51	0.97	0.12	0.42	0.87
Control Delay	90.7	9.2	47.9	5.2	56.5	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.7	9.2	47.9	5.2	56.5	27.6
Queue Length 50th (ft)	254	0	661	36	60	31
Queue Length 95th (ft)	#463	75	#1058	50	94	#195
Internal Link Dist (ft)	2555			3330	4880	
Turn Bay Length (ft)			150			
Base Capacity (vph)	329	494	947	2613	463	516
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.51	0.97	0.12	0.32	0.82

Intersection Summary	
Area Type:	Other

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

PM Horizon Year
15: Reche Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
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
Frt	1.00	0.85	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)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Volume (vph)	300	239	871	306	140	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	252	917	322	147	421
RTOR Reduction (vph)	0	200	0	0	0	343
Lane Group Flow (vph)	316	52	917	322	147	78
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	26.0	26.0	75.1	91.4	12.3	12.3
Effective Green, g (s)	26.0	26.0	75.1	91.4	12.3	12.3
Actuated g/C Ratio	0.21	0.21	0.60	0.73	0.10	0.10
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)	328	294	948	2579	347	139
v/s Ratio Prot	c0.20		c0.58	0.09	0.04	
v/s Ratio Perm		0.04				c0.06
v/c Ratio	0.96	0.18	0.97	0.12	0.42	0.56
Uniform Delay, d1	49.2	40.9	24.0	5.1	53.2	54.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.7	0.3	21.4	0.0	0.8	5.1
Delay (s)	88.9	41.2	45.4	5.1	54.1	59.1
Level of Service	F	D	D	A	D	E
Approach Delay (s)	67.7			34.9	57.8	
Approach LOS	E			C	E	

Intersection Summary			
HCM Average Control Delay	48.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	125.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

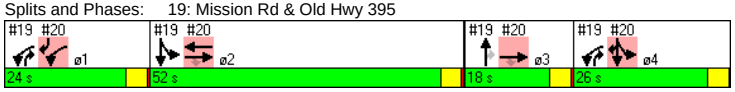
LOS Engineering

PM Horizon Year
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	315	850	128	288	1200	75		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	50.0	0.0	18.0	50.0	52.0	52.0	24.0	26.0
Total Split (%)	41.7%	0.0%	15.0%	41.7%	43.3%	43.3%	20%	22%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	42.5	116.2	13.6	60.1	48.1	48.1		
Actuated g/C Ratio	0.37	1.00	0.12	0.52	0.41	0.41		
v/c Ratio	0.57	0.63	0.62	0.41	0.99	0.10		
Control Delay	37.0	2.4	62.9	19.1	58.4	22.6		
Queue Delay	1.5	0.0	0.0	0.0	0.0	0.0		
Total Delay	38.6	2.4	62.9	19.1	58.4	22.6		
LOS	D	A	E	B	E	C		
Approach Delay	12.2		32.6			56.3		
Approach LOS	B		C			E		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 34.9	Intersection LOS: C
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



LOS Engineering

PM Horizon Year
19: Mission Rd & Old Hwy 395 — Queues

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	315	850	128	288	1200	75
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	332	895	135	303	1263	79
Lane Group Flow (vph)	332	895	135	303	1263	79
v/c Ratio	0.57	0.63	0.62	0.41	0.99	0.10
Control Delay	37.0	2.4	62.9	19.1	58.4	22.6
Queue Delay	1.5	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	2.4	62.9	19.1	58.4	22.6
Queue Length 50th (ft)	192	44	101	134	~538	38
Queue Length 95th (ft)	m251	m14	170	203	#673	71
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	616	1417	225	766	1272	771
Starvation Cap Reductn	140	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.63	0.60	0.40	0.99	0.10

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

LOS Engineering

PM Horizon Year
19: Mission Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	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	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Volume (vph)	315	850	128	288	1200	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	332	895	135	303	1263	79
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	332	895	135	303	1263	79
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	42.4	116.1	13.6	56.0	48.1	48.1
Effective Green, g (s)	42.4	116.1	13.6	56.0	48.1	48.1
Actuated g/C Ratio	0.37	1.00	0.12	0.48	0.41	0.41
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	578	1417	218	732	1273	772
v/s Ratio Prot	0.21		0.07	0.15	c0.41	0.04
v/s Ratio Perm		c0.63		0.06		
v/c Ratio	0.57	0.63	0.62	0.41	0.99	0.10
Uniform Delay, d1	29.6	0.0	48.8	19.4	33.8	20.8
Progression Factor	1.16	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	1.2	5.2	0.4	23.2	0.1
Delay (s)	35.1	1.2	53.9	19.8	57.0	20.9
Level of Service	D	A	D	B	E	C
Approach Delay (s)	10.4		30.3			54.9
Approach LOS	B		C			D

Intersection Summary

HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	116.1	Sum of lost time (s)	4.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

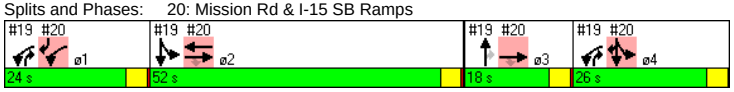
LOS Engineering

PM Horizon Year
20: Mission Rd & I-15 SB Ramps — Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR	ø3
Lane Configurations							
Volume (vph)	1238	250	90	505	20	660	
Turn Type		Perm	Prot			custom	
Protected Phases	2 3		1	2	4	1 4	3
Permitted Phases		2 3				4	
Detector Phases	2 3	2 3	1	2	4	1 4	
Minimum Initial (s)			4.0	4.0	4.0		4.0
Minimum Split (s)			8.0	20.0	20.0		20.0
Total Split (s)	70.0	70.0	24.0	52.0	26.0	50.0	18.0
Total Split (%)	58.3%	58.3%	20.0%	43.3%	21.7%	41.7%	15%
Yellow Time (s)			3.5	3.5	3.5		3.5
All-Red Time (s)			0.5	0.5	0.5		0.5
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode			None	Min	None		None
Act Effct Green (s)	65.7	65.7	17.0	48.1	21.4	42.5	
Actuated g/C Ratio	0.57	0.57	0.15	0.41	0.18	0.37	
v/c Ratio	0.65	0.29	0.41	0.69	0.13	0.90	
Control Delay	6.6	0.4	50.7	34.5	42.0	31.6	
Queue Delay	1.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.8	0.4	50.7	34.5	42.0	31.6	
LOS	A	A	D	C	D	C	
Approach Delay	6.5			36.9	32.2		
Approach LOS	A			D	C		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 78.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



LOS Engineering

PM Horizon Year
20: Mission Rd & I-15 SB Ramps — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.976	
Satd. Flow (prot)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Flt Permitted				0.950							0.976	
Satd. Flow (perm)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			263									394
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	1238	250	90	505	0	0	0	0	20	20	660
Peak Hour Factor	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)	0	1303	263	95	532	0	0	0	0	21	21	695
Lane Group Flow (vph)	0	1303	263	95	532	0	0	0	0	0	42	695
v/c Ratio		0.65	0.29	0.41	0.69						0.13	0.90
Control Delay		6.6	0.4	50.7	34.5						42.0	31.6
Queue Delay		1.2	0.0	0.0	0.0						0.0	0.0
Total Delay		7.8	0.4	50.7	34.5						42.0	31.6
Queue Length 50th (ft)		87	0	66	341						28	247
Queue Length 95th (ft)		m96	m0	120	475						61	#519
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		2015	920	273	771						345	792
Starvation Cap Reductn		449	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.83	0.29	0.35	0.69						0.12	0.88

Intersection Summary	
Area Type:	Other
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

LOS Engineering

PM Horizon Year
20: Mission Rd & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.98	1.00
Satd. Flow (prot)		3539	1417	1583	1863						1817	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.98	1.00
Satd. Flow (perm)		3539	1417	1583	1863						1817	1417
Volume (vph)	0	1238	250	90	505	0	0	0	0	20	20	660
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)	0	1303	263	95	532	0	0	0	0	21	21	695
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	0	0	0	250
Lane Group Flow (vph)	0	1303	149	95	532	0	0	0	0	0	42	445
Turn Type			Perm	Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases			2 3									4
Actuated Green, G (s)		65.7	65.7	17.0	48.1						21.4	42.4
Effective Green, g (s)		65.7	65.7	17.0	48.1						21.4	42.4
Actuated g/C Ratio		0.57	0.57	0.15	0.41						0.18	0.37
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		2003	802	232	772						335	517
v/s Ratio Prot		c0.37		0.06	c0.29						0.02	c0.31
v/s Ratio Perm			0.11									
v/c Ratio		0.65	0.19	0.41	0.69						0.13	0.86
Uniform Delay, d1		17.3	12.2	45.0	27.9						39.5	34.1
Progression Factor		0.32	0.00	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.3	0.1	1.2	2.6						0.2	13.7
Delay (s)		5.9	0.1	46.2	30.4						39.7	47.8
Level of Service		A	A	D	C						D	D
Approach Delay (s)		4.9			32.8			0.0			47.3	
Approach LOS		A			C			A			D	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	116.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

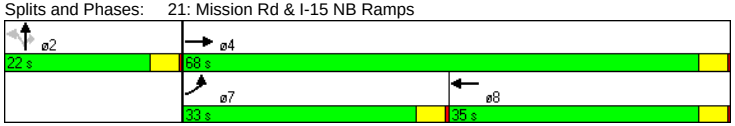
PM Horizon Year
21: Mission Rd & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	970	288	225	20	180
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	33.0	68.0	35.0	22.0	22.0
Total Split (%)	36.7%	75.6%	38.9%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	29.1	48.3	15.2	18.1	18.1
Actuated g/C Ratio	0.39	0.65	0.20	0.24	0.24
v/c Ratio	0.85	0.25	0.68	0.95	0.39
Control Delay	30.3	5.9	36.0	64.0	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	5.9	36.0	64.0	7.0
LOS	C	A	D	E	A
Approach Delay		24.8	36.0	46.0	
Approach LOS		C	D	D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 31.9	Intersection LOS: C
Intersection Capacity Utilization 78.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



LOS Engineering

PM Horizon Year
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	2		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.989				0.850			
Flt Protected	0.950							0.955				
Satd. Flow (prot)	3072	1863	0	0	1842	0	0	1779	1417	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3072	1863	0	0	1842	0	0	1779	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					5				189			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	970	288	0	0	225	20	370	20	180	0	0	0
Peak Hour Factor	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)	1021	303	0	0	237	21	389	21	189	0	0	0
Lane Group Flow (vph)	1021	303	0	0	258	0	0	410	189	0	0	0
v/c Ratio	0.85	0.25			0.68			0.95	0.39			
Control Delay	30.3	5.9			36.0			64.0	7.0			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	30.3	5.9			36.0			64.0	7.0			
Queue Length 50th (ft)	215	50			108			186	0			
Queue Length 95th (ft)	#378	81			180			#398	51			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	1201	1325			638			432	487			
Starvation Cap Reductn	0	0			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.85	0.23			0.40			0.95	0.39			

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	0.97	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)	3072	1863			1842			1778	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	3072	1863			1842			1778	1417			
Volume (vph)	970	288	0	0	225	20	370	20	180	0	0	0
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)	1021	303	0	0	237	21	389	21	189	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	143	0	0	0
Lane Group Flow (vph)	1021	303	0	0	254	0	0	410	46	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	29.1	48.3			15.2			18.1	18.1			
Effective Green, g (s)	29.1	48.3			15.2			18.1	18.1			
Actuated g/C Ratio	0.39	0.65			0.20			0.24	0.24			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	1202	1209			376			433	345			
v/s Ratio Prot	c0.33	0.16			c0.14							
v/s Ratio Perm								0.23	0.03			
v/c Ratio	0.85	0.25			0.68			0.95	0.13			
Uniform Delay, d1	20.7	5.5			27.3			27.7	22.0			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	5.8	0.1			4.8			29.8	0.2			
Delay (s)	26.4	5.6			32.1			57.5	22.2			
Level of Service	C	A			C			E	C			
Approach Delay (s)		21.7			32.1			46.4			0.0	
Approach LOS		C			C			D			A	

Intersection Summary

HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year

22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	20	384	304	30	30	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	404	320	32	32	105
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	756	84	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	756	84	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	59	78			
cM capacity (veh/h)	293	975	1447			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	425	352	137
Volume Left	21	320	0
Volume Right	404	0	105
cSH	874	1447	1700
Volume to Capacity	0.49	0.22	0.08
Queue Length 95th (ft)	68	21	0
Control Delay (s)	13.0	7.6	0.0
Lane LOS	B	A	
Approach Delay (s)	13.0	7.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	9.0		
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

LOS Engineering

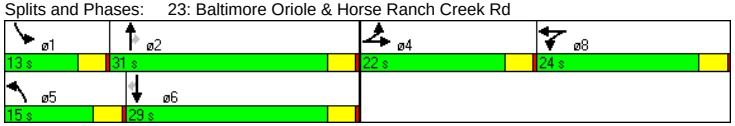
PM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	30	20	226	30	58	269	279	70	304	50
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	8.1	8.1	13.6	13.6	9.1	31.0	31.0	8.9	30.8	30.8
Actuated g/C Ratio	0.11	0.11	0.19	0.19	0.13	0.45	0.45	0.12	0.45	0.45
v/c Ratio	0.18	0.18	0.52	0.50	0.31	0.34	0.37	0.38	0.38	0.08
Control Delay	30.3	22.4	27.2	23.6	29.9	17.2	4.1	31.9	18.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	22.4	27.2	23.6	29.9	17.2	4.1	31.9	18.2	6.7
LOS	C	C	C	C	C	B	A	C	B	A
Approach Delay		26.1		25.3		12.4			19.1	
Approach LOS		C		C		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.7	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 44.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.935			0.958				0.850			0.850
Flt Protected	0.950			0.950	0.974		0.950			0.950		
Satd. Flow (prot)	1583	1742	0	1504	1651	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.974		0.950			0.950		
Satd. Flow (perm)	1583	1742	0	1504	1651	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			20				294			53
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	30	20	15	226	30	45	58	269	279	70	304	50
Peak Hour Factor	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)	32	21	16	238	32	47	61	283	294	74	320	53
Lane Group Flow (vph)	32	37	0	150	167	0	61	283	294	74	320	53
v/c Ratio	0.18	0.18		0.52	0.50		0.31	0.34	0.37	0.38	0.38	0.08
Control Delay	30.3	22.4		27.2	23.6		29.9	17.2	4.1	31.9	18.2	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	22.4		27.2	23.6		29.9	17.2	4.1	31.9	18.2	6.7
Queue Length 50th (ft)	10	6		46	45		18	81	0	22	93	0
Queue Length 95th (ft)	40	37		125	125		63	178	51	76	211	24
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	391	442		456	515		271	1025	912	229	996	782
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.08		0.33	0.32		0.23	0.28	0.32	0.32	0.32	0.07

Intersection Summary

Area Type: Other

LOS Engineering

PM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1742		1504	1651		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1742		1504	1651		1583	1863	1417	1583	1863	1417
Volume (vph)	30	20	15	226	30	45	58	269	279	70	304	50
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)	32	21	16	238	32	47	61	283	294	74	320	53
RTOR Reduction (vph)	0	15	0	0	16	0	0	0	164	0	0	30
Lane Group Flow (vph)	32	22	0	150	151	0	61	283	130	74	320	23
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.8	4.8		12.6	12.6		5.7	30.6	30.6	5.4	30.3	30.3
Effective Green, g (s)	4.8	4.8		12.6	12.6		5.7	30.6	30.6	5.4	30.3	30.3
Actuated g/C Ratio	0.07	0.07		0.18	0.18		0.08	0.44	0.44	0.08	0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	109	120		273	300		130	821	625	123	813	619
v/s Ratio Prot	c0.02	0.01		c0.10	0.09		0.04	0.15		c0.05	c0.17	
v/s Ratio Perm									0.09			0.02
v/c Ratio	0.29	0.18		0.55	0.50		0.47	0.34	0.21	0.60	0.39	0.04
Uniform Delay, d1	30.7	30.5		25.8	25.6		30.4	12.8	11.9	31.0	13.3	11.2
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	1.5	0.7		2.3	1.3		2.7	0.3	0.2	8.0	0.3	0.0
Delay (s)	32.2	31.2		28.1	26.9		33.1	13.0	12.1	39.0	13.6	11.2
Level of Service	C	C		C	C		C	B	B	D	B	B
Approach Delay (s)		31.7			27.5			14.5			17.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Horizon Year
24: Longspur Rd & Horse Ranch Creek Rd

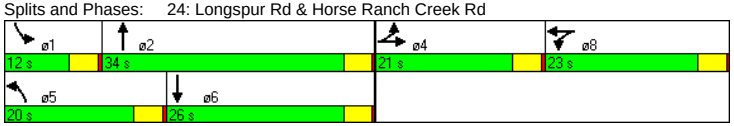
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	50	274	50	138	531	60	415
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	21.0	21.0	23.0	23.0	20.0	34.0	12.0	26.0
Total Split (%)	23.3%	23.3%	25.6%	25.6%	22.2%	37.8%	13.3%	28.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	8.4	8.4	13.3	13.3	11.4	35.2	7.2	28.8
Actuated g/C Ratio	0.11	0.11	0.18	0.18	0.15	0.48	0.09	0.39
v/c Ratio	0.12	0.49	0.68	0.66	0.60	0.51	0.43	0.36
Control Delay	33.2	24.8	41.7	36.5	41.3	16.3	44.3	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	24.8	41.7	36.5	41.3	16.3	44.3	21.1
LOS	C	C	D	D	D	B	D	C
Approach Delay		26.0		39.0		20.0		23.7
Approach LOS		C		D		B		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 73.2
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 25.0 Intersection LOS: C
Intersection Capacity Utilization 54.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
24: Longspur Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.916			0.962			0.949			0.981	
Flt Protected	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (prot)	1583	1706	0	1504	1662	0	1583	3359	0	1583	3472	0
Flt Permitted	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (perm)	1583	1706	0	1504	1662	0	1583	3359	0	1583	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63			17			110			17	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	20	50	65	274	50	50	138	531	275	60	415	60
Peak Hour Factor	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)	21	53	68	288	53	53	145	559	289	63	437	63
Lane Group Flow (vph)	21	121	0	186	208	0	145	848	0	63	500	0
v/c Ratio	0.12	0.49		0.68	0.66		0.60	0.51		0.43	0.36	
Control Delay	33.2	24.8		41.7	36.5		41.3	16.3		44.3	21.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.2	24.8		41.7	36.5		41.3	16.3		44.3	21.1	
Queue Length 50th (ft)	9	26		87	88		65	143		29	92	
Queue Length 95th (ft)	31	77		165	170		129	243		72	168	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	324	399		367	418		320	1671		163	1375	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.30		0.51	0.50		0.45	0.51		0.39	0.36	

Intersection Summary

Area Type: Other

LOS Engineering

PM Horizon Year

24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.96		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1706		1504	1661		1583	3358		1583	3472	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1706		1504	1661		1583	3358		1583	3472	
Volume (vph)	20	50	65	274	50	50	138	531	275	60	415	60
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)	21	53	68	288	53	53	145	559	289	63	437	63
RTOR Reduction (vph)	0	57	0	0	14	0	0	59	0	0	10	0
Lane Group Flow (vph)	21	64	0	186	194	0	145	789	0	63	490	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.9	6.9		13.3	13.3		9.8	35.2		4.3	29.7	
Effective Green, g (s)	6.9	6.9		13.3	13.3		9.8	35.2		4.3	29.7	
Actuated g/C Ratio	0.09	0.09		0.18	0.18		0.13	0.46		0.06	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	144	156		264	292		205	1561		90	1362	
v/s Ratio Prot	0.01	c0.04		c0.12	0.12		c0.09	c0.23		0.04	0.14	
v/s Ratio Perm												
v/c Ratio	0.15	0.41		0.70	0.66		0.71	0.51		0.70	0.36	
Uniform Delay, d1	31.7	32.5		29.4	29.1		31.6	14.2		35.1	16.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.7		8.3	5.6		10.6	1.2		21.1	0.7	
Delay (s)	32.2	34.2		37.6	34.7		42.2	15.3		56.2	17.0	
Level of Service	C	C		D	C		D	B		E	B	
Approach Delay (s)		33.9			36.1			19.3			21.4	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

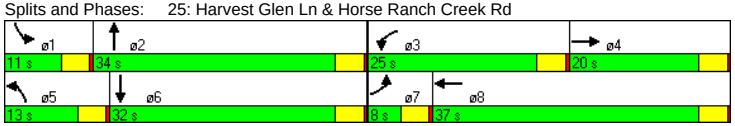
PM Horizon Year

25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	35	245	38	50	861	55	679
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	8.0	20.0	25.0	37.0	13.0	34.0	11.0	32.0
Total Split (%)	8.9%	22.2%	27.8%	41.1%	14.4%	37.8%	12.2%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	4.3	7.3	15.4	20.3	7.5	31.6	6.6	30.7
Actuated g/C Ratio	0.06	0.10	0.23	0.30	0.11	0.47	0.09	0.46
v/c Ratio	0.12	0.29	0.71	0.19	0.32	0.70	0.39	0.45
Control Delay	42.7	27.7	36.8	9.7	38.6	21.7	42.9	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	27.7	36.8	9.7	38.6	21.7	42.9	18.3
LOS	D	C	D	A	D	C	D	B
Approach Delay		30.1		28.9		22.5		20.1
Approach LOS		C		C		C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 67.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 22.9	Intersection LOS: C
Intersection Capacity Utilization 66.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
25: Harvest Glen Ln & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.946			0.907			0.969			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1762	0	1583	1690	0	1583	3429	0	1583	3532	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1762	0	1583	1690	0	1583	3429	0	1583	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			66			39			2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	10	35	20	245	38	63	50	861	227	55	679	10
Peak Hour Factor	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)	11	37	21	258	40	66	53	906	239	58	715	11
Lane Group Flow (vph)	11	58	0	258	106	0	53	1145	0	58	726	0
v/c Ratio	0.12	0.29		0.71	0.19		0.32	0.70		0.39	0.45	
Control Delay	42.7	27.7		36.8	9.7		38.6	21.7		42.9	18.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	42.7	27.7		36.8	9.7		38.6	21.7		42.9	18.3	
Queue Length 50th (ft)	5	17		116	12		24	253		27	143	
Queue Length 95th (ft)	22	53		204	50		61	#424		68	225	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	91	379		475	757		202	1683		161	1660	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.15		0.54	0.14		0.26	0.68		0.36	0.44	

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
25: Harvest Glen Ln & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.91		1.00	0.97		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)	1583	1762		1583	1689		1583	3428		1583	3531	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1762		1583	1689		1583	3428		1583	3531	
Volume (vph)	10	35	20	245	38	63	50	861	227	55	679	10
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)	11	37	21	258	40	66	53	906	239	58	715	11
RTOR Reduction (vph)	0	19	0	0	47	0	0	22	0	0	1	0
Lane Group Flow (vph)	11	39	0	258	59	0	53	1123	0	58	725	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.6	5.6		15.4	20.4		4.3	31.6		3.5	30.8	
Effective Green, g (s)	0.6	5.6		15.4	20.4		4.3	31.6		3.5	30.8	
Actuated g/C Ratio	0.01	0.08		0.21	0.28		0.06	0.44		0.05	0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	13	137		338	478		94	1502		77	1508	
v/s Ratio Prot	0.01	c0.02		c0.16	0.03		0.03	c0.33		c0.04	0.21	
v/s Ratio Perm												
v/c Ratio	0.85	0.28		0.76	0.12		0.56	0.75		0.75	0.48	
Uniform Delay, d1	35.7	31.4		26.6	19.2		33.0	16.9		33.9	14.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	166.4	1.1		9.8	0.1		7.5	2.1		33.5	0.2	
Delay (s)	202.1	32.5		36.5	19.3		40.5	19.0		67.3	15.1	
Level of Service	F	C		D	B		D	B		E	B	
Approach Delay (s)		59.5			31.5			20.0			19.0	
Approach LOS		E			C			B			B	

Intersection Summary

HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	72.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year
26: Pardee South Loop & Horse Ranch Creek Rd

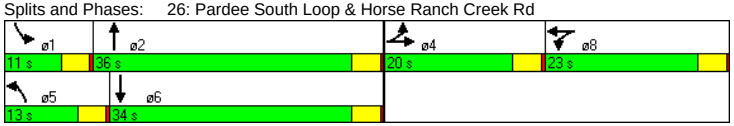
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	50	0	54	0	75	1058	43	821
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	8.5	8.5	8.1	8.1	8.5	50.6	7.0	49.4
Actuated g/C Ratio	0.11	0.11	0.10	0.10	0.11	0.66	0.09	0.65
v/c Ratio	0.32	0.05	0.26	0.26	0.47	0.51	0.32	0.42
Control Delay	32.6	0.2	32.9	19.5	37.1	13.4	36.3	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	0.2	32.9	19.5	37.1	13.4	36.3	13.0
LOS	C	A	C	B	D	B	D	B
Approach Delay		21.7		25.5		14.9		14.0
Approach LOS		C		C		B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 76.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 15.1 Intersection LOS: B
Intersection Capacity Utilization 54.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
26: Pardee South Loop & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.902			0.990			0.985	
Flt Protected	0.950			0.950	0.983		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1569	0	1583	3504	0	1583	3486	0
Flt Permitted	0.950			0.950	0.983		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1569	0	1583	3504	0	1583	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		416			32			9			14	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	50	0	26	54	0	30	75	1058	74	43	821	90
Peak Hour Factor	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)	53	0	27	57	0	32	79	1114	78	45	864	95
Lane Group Flow (vph)	53	27	0	40	49	0	79	1192	0	45	959	0
v/c Ratio	0.32	0.05		0.26	0.26		0.47	0.51		0.32	0.42	
Control Delay	32.6	0.2		32.9	19.5		37.1	13.4		36.3	13.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.6	0.2		32.9	19.5		37.1	13.4		36.3	13.0	
Queue Length 50th (ft)	21	0		16	7		32	208		18	160	
Queue Length 95th (ft)	54	0		47	37		76	331		51	257	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	308	643		333	373		190	2330		150	2265	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.04		0.12	0.13		0.42	0.51		0.30	0.42	

Intersection Summary

Area Type: Other

LOS Engineering

PM Horizon Year

26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.90		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1569		1583	3504		1583	3487	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1569		1583	3504		1583	3487	
Volume (vph)	50	0	26	54	0	30	75	1058	74	43	821	90
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)	53	0	27	57	0	32	79	1114	78	45	864	95
RTOR Reduction (vph)	0	25	0	0	30	0	0	4	0	0	6	0
Lane Group Flow (vph)	53	2	0	40	19	0	79	1188	0	45	953	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.8	5.8		5.4	5.4		5.6	48.6		4.4	47.4	
Effective Green, g (s)	5.8	5.8		5.4	5.4		5.6	48.6		4.4	47.4	
Actuated g/C Ratio	0.07	0.07		0.07	0.07		0.07	0.61		0.05	0.59	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	114	114		101	106		111	2123		87	2061	
v/s Ratio Prot	c0.03	0.00		c0.03	0.01		c0.05	c0.34		0.03	0.27	
v/s Ratio Perm												
v/c Ratio	0.46	0.02		0.40	0.18		0.71	0.56		0.52	0.46	
Uniform Delay, d1	35.7	34.6		35.8	35.3		36.5	9.4		36.9	9.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.1		2.5	0.8		19.3	0.3		5.1	0.2	
Delay (s)	38.7	34.6		38.4	36.1		55.8	9.7		42.0	9.4	
Level of Service	D	C		D	D		E	A		D	A	
Approach Delay (s)		37.3			37.1			12.6			10.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Horizon Year

27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	70	1179	50	0	892
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	74	1241	53	0	939
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1737	647			1294	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1737	647			1294	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	82			100	
cM capacity (veh/h)	78	414			532	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	827	466	469	469
Volume Left	0	0	0	0	0
Volume Right	74	0	53	0	0
cSH	414	1700	1700	1700	1700
Volume to Capacity	0.18	0.49	0.27	0.28	0.28
Queue Length 95th (ft)	16	0	0	0	0
Control Delay (s)	15.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.6	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

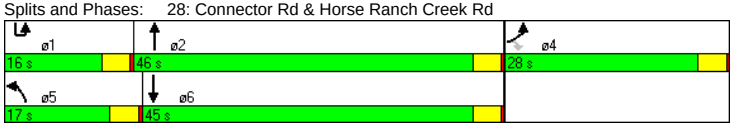
PM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT
Lane Configurations						
Volume (vph)	579	18	15	634	50	445
Turn Type		Perm	Prot		Prot	
Protected Phases	4		5	2	1	6
Permitted Phases		4				
Detector Phases	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	28.0	28.0	17.0	46.0	16.0	45.0
Total Split (%)	31.1%	31.1%	18.9%	51.1%	17.8%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	None	Min
Act Effct Green (s)	14.6	14.6	6.6	15.2	7.4	17.4
Actuated g/C Ratio	0.34	0.34	0.13	0.35	0.15	0.40
v/c Ratio	0.58	0.04	0.08	0.53	0.22	0.62
Control Delay	16.3	7.9	28.1	14.6	25.5	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	7.9	28.1	14.6	25.5	8.3
LOS	B	A	C	B	C	A
Approach Delay	16.0			15.0		9.2
Approach LOS	B			B		A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 43	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.923	
Flt Protected	0.950		0.950		0.950		
Satd. Flow (prot)	3072	1417	1583	3539	1583	3267	0
Flt Permitted	0.950		0.950		0.950		
Satd. Flow (perm)	3072	1417	1583	3539	1583	3267	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		19				386	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	579	18	15	634	50	445	464
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	609	19	16	667	53	468	488
Lane Group Flow (vph)	609	19	16	667	53	956	0
v/c Ratio	0.58	0.04	0.08	0.53	0.22	0.62	
Control Delay	16.3	7.9	28.1	14.6	25.5	8.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.3	7.9	28.1	14.6	25.5	8.3	
Queue Length 50th (ft)	43	0	3	44	8	37	
Queue Length 95th (ft)	166	13	24	171	52	158	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1486	695	384	2193	374	2219	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.41	0.03	0.04	0.30	0.14	0.43	

Intersection Summary	
Area Type:	Other

LOS Engineering

PM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	0.92	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3072	1417	1583	3539	1583	3268	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3072	1417	1583	3539	1583	3268	
Volume (vph)	579	18	15	634	50	445	464
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	609	19	16	667	53	468	488
RTOR Reduction (vph)	0	13	0	0	0	237	0
Lane Group Flow (vph)	609	6	16	667	53	719	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	14.6	14.6	0.9	15.7	2.5	17.3	
Effective Green, g (s)	14.6	14.6	0.9	15.7	2.5	17.3	
Actuated g/C Ratio	0.33	0.33	0.02	0.35	0.06	0.39	
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)	1001	462	32	1240	88	1262	
v/s Ratio Prot	c0.20		0.01	0.19	c0.03	c0.22	
v/s Ratio Perm		0.00					
v/c Ratio	0.61	0.01	0.50	0.54	0.60	0.57	
Uniform Delay, d1	12.7	10.2	21.7	11.6	20.7	10.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.0	11.8	0.5	11.1	0.6	
Delay (s)	13.8	10.2	33.5	12.1	31.7	11.4	
Level of Service	B	B	C	B	C	B	
Approach Delay (s)	13.6			12.6		12.5	
Approach LOS	B			B		B	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

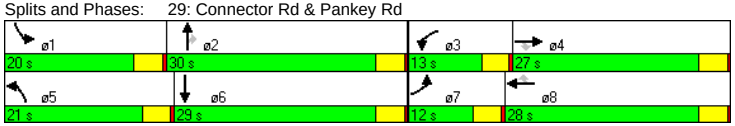
LOS Engineering

PM Horizon Year
29: Connector Rd & Pankey Rd — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	90	438	310	29	252	274	210	380	43	221	480
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	12.0	27.0	27.0	13.0	28.0	28.0	21.0	30.0	30.0	20.0	29.0
Total Split (%)	13.3%	30.0%	30.0%	14.4%	31.1%	31.1%	23.3%	33.3%	33.3%	22.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	7.6	23.8	23.8	7.1	21.3	21.3	14.8	25.3	25.3	14.8	25.3
Actuated g/C Ratio	0.09	0.29	0.29	0.08	0.26	0.26	0.18	0.31	0.31	0.18	0.31
v/c Ratio	0.66	0.90	0.53	0.24	0.55	0.50	0.78	0.70	0.10	0.82	0.93
Control Delay	62.2	54.6	6.8	42.4	33.1	6.8	53.7	34.8	8.1	58.7	55.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.2	54.6	6.8	42.4	33.1	6.8	53.7	34.8	8.1	58.7	55.0
LOS	E	D	A	D	C	A	D	C	A	E	D
Approach Delay		37.7			20.6			39.3			56.1
Approach LOS		D			C			D			E

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 82.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 39.4	Intersection LOS: D
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



LOS Engineering

PM Horizon Year
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			326			288			45		2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	90	438	310	29	252	274	210	380	43	221	480	20
Peak Hour Factor	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)	95	461	326	31	265	288	221	400	45	233	505	21
Lane Group Flow (vph)	95	461	326	31	265	288	221	400	45	233	526	0
v/c Ratio	0.66	0.90	0.53	0.24	0.55	0.50	0.78	0.70	0.10	0.82	0.93	
Control Delay	62.2	54.6	6.8	42.4	33.1	6.8	53.7	34.8	8.1	58.7	55.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	62.2	54.6	6.8	42.4	33.1	6.8	53.7	34.8	8.1	58.7	55.0	
Queue Length 50th (ft)	52	269	0	17	129	0	116	198	0	126	290	
Queue Length 95th (ft)	#126	#490	71	44	206	60	#225	#319	25	#254	#519	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	150	510	620	161	528	608	319	584	475	304	568	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.63	0.90	0.53	0.19	0.50	0.47	0.69	0.68	0.09	0.77	0.93	

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	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	0.99	
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)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	
Volume (vph)	90	438	310	29	252	274	210	380	43	221	480	20
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)	95	461	326	31	265	288	221	400	45	233	505	21
RTOR Reduction (vph)	0	0	234	0	0	213	0	0	32	0	1	0
Lane Group Flow (vph)	95	461	92	31	265	75	221	400	13	233	525	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.2	23.8	23.8	4.5	22.1	22.1	14.8	25.3	25.3	14.8	25.3	
Effective Green, g (s)	6.2	23.8	23.8	4.5	22.1	22.1	14.8	25.3	25.3	14.8	25.3	
Actuated g/C Ratio	0.07	0.28	0.28	0.05	0.26	0.26	0.18	0.30	0.30	0.18	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	116	499	380	84	488	371	278	558	425	278	555	
v/s Ratio Prot	c0.06	c0.26		0.02	0.14		0.14	0.21		c0.15	c0.28	
v/s Ratio Perm			0.07			0.05			0.01			
v/c Ratio	0.82	0.92	0.24	0.37	0.54	0.20	0.79	0.72	0.03	0.84	0.95	
Uniform Delay, d1	38.5	29.4	23.3	38.6	26.8	24.3	33.3	26.4	20.9	33.6	28.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	34.4	22.9	0.3	2.7	1.2	0.3	14.5	4.4	0.0	19.3	25.1	
Delay (s)	72.9	52.3	23.7	41.3	28.0	24.6	47.8	30.7	20.9	52.9	54.0	
Level of Service	E	D	C	D	C	C	D	C	C	D	D	
Approach Delay (s)		43.9			27.0			35.7			53.6	
Approach LOS		D			C			D			D	

Intersection Summary

HCM Average Control Delay	41.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	84.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering