

Appendix E – Cumulative plus Project Conditions Level of Service Worksheets

HCM Unsignalized Intersection Capacity Analysis

1: Project Entrance & Sherburne Hills Rd

Timing Plan: A.M. Peak
12/11/2018

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	0	0	0	1	11
Future Volume (Veh/h)	26	0	0	0	1	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.92	0.92	0.69	0.69
Hourly flow rate (vph)	30	0	0	0	1	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				60	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				60	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				100	99
cM capacity (veh/h)	1623				929	1085
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	30	0	17			
Volume Left	30	0	1			
Volume Right	0	0	16			
cSH	1623	1700	1074			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (ft)	1	0	1			
Control Delay (s)	7.3	0.0	8.4			
Lane LOS	A		A			
Approach Delay (s)	7.3	0.0	8.4			
Approach LOS			A			
Intersection Summary						
Average Delay			7.7			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis 2: Sherburne Hills Rd & Camino Tassajara

Timing Plan: A.M. Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	651	9	3	1135	66	18	0	6	43	2	66
Future Volume (vph)	38	651	9	3	1135	66	18	0	6	43	2	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.85			0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	3531		1770	3505		1768	1583			1668	
Flt Permitted	0.95	1.00		0.95	1.00		0.66	1.00			0.87	
Satd. Flow (perm)	1770	3531		1770	3505		1224	1583			1482	
Peak-hour factor, PHF	0.82	0.82	0.82	0.98	0.98	0.98	0.82	0.82	0.82	0.72	0.72	0.72
Adj. Flow (vph)	46	794	11	3	1158	67	22	0	7	60	3	92
RTOR Reduction (vph)	0	1	0	0	3	0	0	6	0	0	76	0
Lane Group Flow (vph)	46	804	0	3	1222	0	22	1	0	0	79	0
Confl. Peds. (#/hr)			3			3	2					2
Confl. Bikes (#/hr)						3						
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	2.5	31.5		0.8	29.8		9.1	9.1			9.1	
Effective Green, g (s)	2.5	31.5		0.8	29.8		9.1	9.1			9.1	
Actuated g/C Ratio	0.05	0.59		0.01	0.56		0.17	0.17			0.17	
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)	82	2082		26	1955		208	269			252	
v/s Ratio Prot	c0.03	0.23		0.00	c0.35			0.00				
v/s Ratio Perm							0.02				c0.05	
v/c Ratio	0.56	0.39		0.12	0.63		0.11	0.00			0.31	
Uniform Delay, d1	24.9	5.8		26.0	8.0		18.7	18.4			19.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	8.5	0.1		2.0	0.6		0.2	0.0			0.7	
Delay (s)	33.4	5.9		27.9	8.6		18.9	18.4			20.1	
Level of Service	C	A		C	A		B	B			C	
Approach Delay (s)		7.4			8.7			18.8			20.1	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM 2000 Control Delay		9.1					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.55										
Actuated Cycle Length (s)		53.4					Sum of lost time (s)		12.0			
Intersection Capacity Utilization		54.5%					ICU Level of Service		A			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: Creekside Ave./Holbrook Dr & Camino Tassajara

Timing Plan: A.M. Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	586	12	8	1108	75	33	6	26	40	1	62
Future Volume (vph)	90	586	12	8	1108	75	33	6	26	40	1	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99			0.95		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1770	3527		1770	3500			1711		1770	1588	
Flt Permitted	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1770	3527		1770	3500			1711		1770	1588	
Peak-hour factor, PHF	0.81	0.81	0.81	0.95	0.95	0.95	0.90	0.90	0.90	0.52	0.52	0.52
Adj. Flow (vph)	111	723	15	8	1166	79	37	7	29	77	2	119
RTOR Reduction (vph)	0	1	0	0	4	0	0	26	0	0	108	0
Lane Group Flow (vph)	111	737	0	8	1241	0	0	47	0	77	13	0
Confl. Peds. (#/hr)			1			1			1			
Confl. Bikes (#/hr)						4						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	8.4	51.3		1.2	44.1			7.4		8.1	8.1	
Effective Green, g (s)	8.4	51.3		1.2	44.1			7.4		8.1	8.1	
Actuated g/C Ratio	0.10	0.60		0.01	0.52			0.09		0.10	0.10	
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0		4.0	4.0	
Vehicle Extension (s)	1.8	4.0		1.8	4.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	174	2128		24	1815			148		168	151	
v/s Ratio Prot	c0.06	0.21		0.00	c0.35			c0.03		c0.04	0.01	
v/s Ratio Perm												
v/c Ratio	0.64	0.35		0.33	0.68			0.31		0.46	0.09	
Uniform Delay, d1	36.8	8.4		41.5	15.3			36.4		36.4	35.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	5.5	0.4		3.0	2.1			0.4		0.7	0.1	
Delay (s)	42.4	8.9		44.5	17.4			36.9		37.1	35.2	
Level of Service	D	A		D	B			D		D	D	
Approach Delay (s)		13.3			17.5			36.9			35.9	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			18.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)				17.0		
Intersection Capacity Utilization			59.8%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: Crow Canyon Rd/Blackhawk Rd & Camino Tassajara

Timing Plan: A.M. Peak
12/11/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↱	↕	↱	↰↱	↕		↰↱	↕	↱	↰↱	↕	↱
Traffic Volume (vph)	162	349	222	645	596	163	315	283	227	113	362	155
Future Volume (vph)	162	349	222	645	596	163	315	283	227	113	362	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95		0.97	0.91	0.91	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.97	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1563	4990	3415		3433	3280	1421	3433	3539	1563
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1563	4990	3415		3433	3280	1421	3433	3539	1563
Peak-hour factor, PHF	0.90	0.90	0.90	0.86	0.86	0.86	0.95	0.95	0.95	0.83	0.83	0.83
Adj. Flow (vph)	180	388	247	750	693	190	332	298	239	136	436	187
RTOR Reduction (vph)	0	0	198	0	15	0	0	12	120	0	0	148
Lane Group Flow (vph)	180	388	49	750	868	0	332	360	45	136	436	39
Confl. Peds. (#/hr)			1						1			
Confl. Bikes (#/hr)						3			1			1
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	10.3	20.0	20.0	26.5	36.2		15.0	27.3	27.3	8.9	21.2	21.2
Effective Green, g (s)	10.3	20.0	20.0	26.5	36.2		15.0	27.3	27.3	8.9	21.2	21.2
Actuated g/C Ratio	0.10	0.20	0.20	0.26	0.36		0.15	0.27	0.27	0.09	0.21	0.21
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	351	702	310	1313	1227		511	889	385	303	745	329
v/s Ratio Prot	0.05	c0.11		0.15	c0.25		c0.10	0.11		0.04	c0.12	
v/s Ratio Perm			0.03						0.03			0.03
v/c Ratio	0.51	0.55	0.16	0.57	0.71		0.65	0.40	0.12	0.45	0.59	0.12
Uniform Delay, d1	42.8	36.3	33.4	32.2	27.7		40.4	30.0	27.6	43.6	35.8	32.2
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	0.5	1.2	0.3	0.4	2.0		2.1	0.4	0.2	0.4	1.4	0.2
Delay (s)	43.4	37.5	33.7	32.5	29.7		42.5	30.5	27.8	44.0	37.2	32.4
Level of Service	D	D	C	C	C		D	C	C	D	D	C
Approach Delay (s)		37.6			31.0			34.6			37.2	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			34.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			100.7			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			60.3%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Camino Ramon/Driveway & Sycamore Valley Rd

Timing Plan: A.M. Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	698	329	107	1387	14	490	9	77	8	11	27
Future Volume (vph)	25	698	329	107	1387	14	490	9	77	8	11	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		5.4	5.4		4.7	4.7	4.7
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86		0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.93		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	6395		3433	1492		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	6395		3433	1492		1770	1863	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.55	0.55	0.55
Adj. Flow (vph)	28	776	366	116	1508	15	557	10	88	15	20	49
RTOR Reduction (vph)	0	0	135	0	1	0	0	68	0	0	0	46
Lane Group Flow (vph)	28	776	231	116	1522	0	557	30	0	15	20	3
Confl. Peds. (#/hr)						16			58			
Confl. Bikes (#/hr)									1			
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2									7
Actuated Green, G (s)	5.5	66.0	66.0	14.0	74.5		31.4	31.4		8.0	8.0	8.0
Effective Green, g (s)	5.5	66.0	66.0	14.0	74.5		31.4	31.4		8.0	8.0	8.0
Actuated g/C Ratio	0.04	0.47	0.47	0.10	0.53		0.22	0.22		0.06	0.06	0.06
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		5.4	5.4		4.7	4.7	4.7
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	69	2397	746	177	3403		769	334		101	106	90
v/s Ratio Prot	0.02	0.15		c0.07	c0.24		c0.16	0.02		0.01	c0.01	
v/s Ratio Perm			0.15									0.00
v/c Ratio	0.41	0.32	0.31	0.66	0.45		0.72	0.09		0.15	0.19	0.03
Uniform Delay, d1	65.7	23.1	22.9	60.7	20.1		50.3	43.0		62.8	62.9	62.3
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	1.4	0.4	1.1	6.5	0.4		2.9	0.0		0.2	0.3	0.1
Delay (s)	67.1	23.4	24.0	67.2	20.5		53.2	43.0		63.0	63.2	62.4
Level of Service	E	C	C	E	C		D	D		E	E	E
Approach Delay (s)		24.7			23.8			51.7			62.7	
Approach LOS		C			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			30.2			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				20.6		
Intersection Capacity Utilization			78.0%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

1: Project Entrance & Sherburne Hills Rd

Midday Peak
12/11/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	14	0	0	0	3	21
Future Volume (Veh/h)	14	0	0	0	3	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.54	0.54	0.92	0.92	0.82	0.82
Hourly flow rate (vph)	26	0	0	0	4	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				52	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				52	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				100	98
cM capacity (veh/h)	1623				941	1085
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	26	0	30			
Volume Left	26	0	4			
Volume Right	0	0	26			
cSH	1623	1700	1063			
Volume to Capacity	0.02	0.00	0.03			
Queue Length 95th (ft)	1	0	2			
Control Delay (s)	7.3	0.0	8.5			
Lane LOS	A		A			
Approach Delay (s)	7.3	0.0	8.5			
Approach LOS			A			
Intersection Summary						
Average Delay			7.9			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

2: Sherburne Hills Rd & Camino Tassajara

Midday Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	890	11	17	812	72	13	0	6	70	1	69
Future Volume (vph)	54	890	11	17	812	72	13	0	6	70	1	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.85			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	3532		1770	3488		1770	1583			1696	
Flt Permitted	0.95	1.00		0.95	1.00		0.69	1.00			0.84	
Satd. Flow (perm)	1770	3532		1770	3488		1284	1583			1456	
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.75	0.75	0.75	0.79	0.79	0.79
Adj. Flow (vph)	59	967	12	19	923	82	17	0	8	89	1	87
RTOR Reduction (vph)	0	1	0	0	6	0	0	7	0	0	72	0
Lane Group Flow (vph)	59	978	0	19	999	0	17	1	0	0	105	0
Confl. Peds. (#/hr)			1			6						
Confl. Bikes (#/hr)			3			2						
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	2.3	23.6		0.7	22.0		6.7	6.7			6.7	
Effective Green, g (s)	2.3	23.6		0.7	22.0		6.7	6.7			6.7	
Actuated g/C Ratio	0.05	0.55		0.02	0.51		0.16	0.16			0.16	
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)	94	1938		28	1784		200	246			226	
v/s Ratio Prot	c0.03	0.28		0.01	c0.29			0.00				
v/s Ratio Perm							0.01				c0.07	
v/c Ratio	0.63	0.50		0.68	0.56		0.09	0.01			0.47	
Uniform Delay, d1	19.9	6.1		21.0	7.2		15.5	15.3			16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	12.4	0.2		49.7	0.4		0.2	0.0			1.5	
Delay (s)	32.3	6.3		70.7	7.6		15.7	15.3			18.0	
Level of Service	C	A		E	A		B	B			B	
Approach Delay (s)		7.7			8.7			15.6			18.0	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			9.1			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			43.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.9%			ICU Level of Service			A			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Creekside Ave./Holbrook Dr & Camino Tassajara

Midday Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	841	25	16	797	47	17	3	9	61	2	83
Future Volume (vph)	77	841	25	16	797	47	17	3	9	61	2	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99			0.96		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1770	3522		1770	3502			1728		1770	1590	
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (perm)	1770	3522		1770	3502			1728		1770	1590	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.96	0.96	0.96	0.49	0.49	0.49
Adj. Flow (vph)	83	904	27	17	857	51	18	3	9	124	4	169
RTOR Reduction (vph)	0	1	0	0	3	0	0	8	0	0	150	0
Lane Group Flow (vph)	83	930	0	17	905	0	0	22	0	124	23	0
Confl. Peds. (#/hr)							7		2			
Confl. Bikes (#/hr)			4			2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	7.5	53.4		2.5	48.4			7.2		9.9	9.9	
Effective Green, g (s)	7.5	53.4		2.5	48.4			7.2		9.9	9.9	
Actuated g/C Ratio	0.08	0.59		0.03	0.54			0.08		0.11	0.11	
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0		4.0	4.0	
Vehicle Extension (s)	1.8	4.0		1.8	4.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	147	2089		49	1883			138		194	174	
v/s Ratio Prot	c0.05	0.26		0.01	c0.26			c0.01		c0.07	0.01	
v/s Ratio Perm												
v/c Ratio	0.56	0.45		0.35	0.48			0.16		0.64	0.13	
Uniform Delay, d1	39.7	10.1		42.9	13.0			38.6		38.3	36.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.7		1.6	0.9			0.2		5.0	0.1	
Delay (s)	42.6	10.8		44.5	13.8			38.8		43.3	36.3	
Level of Service	D	B		D	B			D		D	D	
Approach Delay (s)		13.4			14.4			38.8			39.2	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			17.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				17.0		
Intersection Capacity Utilization			48.1%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: Crow Canyon Rd/Blackhawk Rd & Camino Tassajara

Midday Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	178	497	189	366	399	201	336	407	318	161	297	180
Future Volume (vph)	178	497	189	366	399	201	336	407	318	161	297	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95		0.97	0.91	0.91	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1558	4990	3337		3433	3283	1414	3433	3539	1561
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1558	4990	3337		3433	3283	1414	3433	3539	1561
Peak-hour factor, PHF	0.96	0.96	0.96	0.89	0.89	0.89	0.94	0.94	0.94	0.91	0.91	0.91
Adj. Flow (vph)	185	518	197	411	448	226	357	433	338	177	326	198
RTOR Reduction (vph)	0	0	147	0	41	0	0	12	172	0	0	155
Lane Group Flow (vph)	185	518	50	411	633	0	357	522	65	177	326	43
Confl. Peds. (#/hr)			5			10			5			1
Confl. Bikes (#/hr)									2			1
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	10.0	22.2	22.2	13.4	25.6		14.8	24.1	24.1	9.8	19.1	19.1
Effective Green, g (s)	10.0	22.2	22.2	13.4	25.6		14.8	24.1	24.1	9.8	19.1	19.1
Actuated g/C Ratio	0.11	0.25	0.25	0.15	0.29		0.17	0.28	0.28	0.11	0.22	0.22
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	392	897	395	764	976		580	904	389	384	772	340
v/s Ratio Prot	0.05	c0.15		0.08	c0.19		c0.10	c0.16		0.05	0.09	
v/s Ratio Perm			0.03						0.05			0.03
v/c Ratio	0.47	0.58	0.13	0.54	0.65		0.62	0.58	0.17	0.46	0.42	0.13
Uniform Delay, d1	36.3	28.5	25.2	34.2	27.0		33.7	27.3	24.1	36.4	29.4	27.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1	0.2	0.4	1.7		1.4	1.1	0.3	0.3	0.5	0.2
Delay (s)	36.6	29.6	25.4	34.6	28.7		35.1	28.4	24.4	36.7	30.0	27.7
Level of Service	D	C	C	C	C		D	C	C	D	C	C
Approach Delay (s)		30.1			30.9			29.7			31.0	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			87.5			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			59.7%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 5: Camino Ramon/Driveway & Sycamore Valley Rd

Midday Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	1034	388	62	947	9	445	3	98	2	1	20
Future Volume (vph)	23	1034	388	62	947	9	445	3	98	2	1	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		5.4	5.4		4.7	4.7	4.7
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86		0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.96		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	6398		3433	1526		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	6398		3433	1526		1770	1863	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.89	0.89	0.89	0.88	0.88	0.88	0.79	0.79	0.79
Adj. Flow (vph)	24	1066	400	70	1064	10	506	3	111	3	1	25
RTOR Reduction (vph)	0	0	93	0	0	0	0	88	0	0	0	24
Lane Group Flow (vph)	24	1066	307	70	1074	0	506	26	0	3	1	1
Confl. Peds. (#/hr)						1			24			
Confl. Bikes (#/hr)									1			
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2									7
Actuated Green, G (s)	5.4	75.7	75.7	8.9	79.2		28.8	28.8		6.0	6.0	6.0
Effective Green, g (s)	5.4	75.7	75.7	8.9	79.2		28.8	28.8		6.0	6.0	6.0
Actuated g/C Ratio	0.04	0.54	0.54	0.06	0.57		0.21	0.21		0.04	0.04	0.04
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		5.4	5.4		4.7	4.7	4.7
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	68	2749	855	112	3619		706	313		75	79	67
v/s Ratio Prot	0.01	c0.21		c0.04	c0.17		c0.15	0.02		c0.00	0.00	
v/s Ratio Perm			0.19									0.00
v/c Ratio	0.35	0.39	0.36	0.62	0.30		0.72	0.08		0.04	0.01	0.02
Uniform Delay, d1	65.6	18.7	18.3	63.9	15.9		51.8	44.9		64.2	64.2	64.2
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	1.2	0.4	1.2	7.6	0.2		2.9	0.0		0.1	0.0	0.0
Delay (s)	66.7	19.1	19.5	71.5	16.1		54.7	45.0		64.3	64.2	64.2
Level of Service	E	B	B	E	B		D	D		E	E	E
Approach Delay (s)		20.0			19.5			52.9			64.2	
Approach LOS		B			B			D			E	
Intersection Summary												
HCM 2000 Control Delay			26.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				20.6		
Intersection Capacity Utilization			75.1%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

1: Sherburne Hills Rd

P.M. Peak
12/11/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	19	0	0	0	3	21
Future Volume (Veh/h)	19	0	0	0	3	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	0	0	0	3	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				42	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				42	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	98
cM capacity (veh/h)	1623				957	1085
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	21	0	26			
Volume Left	21	0	3			
Volume Right	0	0	23			
cSH	1623	1700	1068			
Volume to Capacity	0.01	0.00	0.02			
Queue Length 95th (ft)	1	0	2			
Control Delay (s)	7.2	0.0	8.5			
Lane LOS	A		A			
Approach Delay (s)	7.2	0.0	8.5			
Approach LOS			A			
Intersection Summary						
Average Delay		7.9				
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis 2: Sherburne Hills Rd & Camino Tassajara

P.M. Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	1180	18	8	701	46	12	2	6	48	0	45
Future Volume (vph)	46	1180	18	8	701	46	12	2	6	48	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.88			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1770	3530		1770	3500		1770	1648			1697	
Flt Permitted	0.95	1.00		0.95	1.00		0.79	1.00			0.83	
Satd. Flow (perm)	1770	3530		1770	3500		1465	1648			1447	
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.59	0.59	0.59	0.73	0.73	0.73
Adj. Flow (vph)	49	1269	19	9	762	50	20	3	10	66	0	62
RTOR Reduction (vph)	0	1	0	0	4	0	0	9	0	0	63	0
Lane Group Flow (vph)	49	1287	0	9	808	0	20	4	0	0	65	0
Confl. Peds. (#/hr)			2			4						
Confl. Bikes (#/hr)			6			10						
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.7	25.4		0.8	24.5		5.9	5.9			5.9	
Effective Green, g (s)	1.7	25.4		0.8	24.5		5.9	5.9			5.9	
Actuated g/C Ratio	0.04	0.58		0.02	0.56		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)	68	2033		32	1944		195	220			193	
v/s Ratio Prot	c0.03	c0.36		0.01	0.23			0.00				
v/s Ratio Perm							0.01				c0.04	
v/c Ratio	0.72	0.63		0.28	0.42		0.10	0.02			0.34	
Uniform Delay, d1	21.0	6.2		21.4	5.7		16.8	16.6			17.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	31.1	0.7		4.8	0.1		0.2	0.0			1.0	
Delay (s)	52.1	6.9		26.1	5.8		17.0	16.6			18.4	
Level of Service	D	A		C	A		B	B			B	
Approach Delay (s)		8.5			6.0			16.9			18.4	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay		8.3					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.60										
Actuated Cycle Length (s)		44.1					Sum of lost time (s)		12.0			
Intersection Capacity Utilization		57.0%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: Creekside Ave./Holbrook Dr & Camino Tassajara

P.M. Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	1129	34	28	675	72	19	2	11	53	1	47
Future Volume (vph)	61	1129	34	28	675	72	19	2	11	53	1	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99			0.95		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1770	3521		1770	3477			1716		1770	1588	
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (perm)	1770	3521		1770	3477			1716		1770	1588	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.63	0.63	0.63	0.76	0.76	0.76
Adj. Flow (vph)	67	1241	37	30	734	78	30	3	17	70	1	62
RTOR Reduction (vph)	0	1	0	0	5	0	0	16	0	0	57	0
Lane Group Flow (vph)	67	1277	0	30	807	0	0	34	0	70	6	0
Confl. Peds. (#/hr)			3			4			5			
Confl. Bikes (#/hr)			6			8						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	6.7	54.3		4.0	51.6			7.7		7.0	7.0	
Effective Green, g (s)	6.7	54.3		4.0	51.6			7.7		7.0	7.0	
Actuated g/C Ratio	0.07	0.60		0.04	0.57			0.09		0.08	0.08	
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0		4.0	4.0	
Vehicle Extension (s)	1.8	4.0		1.8	4.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	131	2124		78	1993			146		137	123	
v/s Ratio Prot	c0.04	c0.36		0.02	0.23			c0.02		c0.04	0.00	
v/s Ratio Perm												
v/c Ratio	0.51	0.60		0.38	0.40			0.24		0.51	0.05	
Uniform Delay, d1	40.1	11.1		41.8	10.7			38.4		39.9	38.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.4	1.3		1.1	0.6			0.3		1.3	0.1	
Delay (s)	41.5	12.4		43.0	11.3			38.7		41.2	38.5	
Level of Service	D	B		D	B			D		D	D	
Approach Delay (s)		13.8			12.4			38.7			39.9	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			15.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			57.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 4: Crow Canyon Rd/Blackhawk Rd & Camino Tassajara

P.M. Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	672	215	330	433	217	433	488	450	218	326	162
Future Volume (vph)	186	672	215	330	433	217	433	488	450	218	326	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95		0.97	0.91	0.91	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.96	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1551	4990	3322		3433	3251	1418	3433	3539	1550
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1551	4990	3322		3433	3251	1418	3433	3539	1550
Peak-hour factor, PHF	0.90	0.90	0.90	0.93	0.93	0.93	0.98	0.98	0.98	0.93	0.93	0.93
Adj. Flow (vph)	207	747	239	355	466	233	442	498	459	234	351	174
RTOR Reduction (vph)	0	0	145	0	40	0	0	18	209	0	0	134
Lane Group Flow (vph)	207	747	94	355	659	0	442	645	85	234	351	40
Confl. Peds. (#/hr)			8			19			2			8
Confl. Bikes (#/hr)						3			2			
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	11.1	30.4	30.4	13.9	33.2		18.2	30.4	30.4	11.9	24.1	24.1
Effective Green, g (s)	11.1	30.4	30.4	13.9	33.2		18.2	30.4	30.4	11.9	24.1	24.1
Actuated g/C Ratio	0.11	0.29	0.29	0.13	0.32		0.17	0.29	0.29	0.11	0.23	0.23
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	364	1028	450	663	1054		597	944	412	390	815	357
v/s Ratio Prot	0.06	c0.21		0.07	c0.20		c0.13	c0.20		0.07	0.10	
v/s Ratio Perm			0.06						0.06			0.03
v/c Ratio	0.57	0.73	0.21	0.54	0.63		0.74	0.68	0.21	0.60	0.43	0.11
Uniform Delay, d1	44.5	33.4	28.0	42.3	30.4		41.0	32.8	28.0	44.1	34.4	31.8
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	1.2	2.8	0.3	0.4	1.3		4.3	2.2	0.3	1.7	0.5	0.2
Delay (s)	45.7	36.1	28.3	42.8	31.7		45.3	35.1	28.3	45.7	34.9	32.0
Level of Service	D	D	C	D	C		D	D	C	D	C	C
Approach Delay (s)		36.2			35.4			36.9			37.6	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			36.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			104.6			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			66.2%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Camino Ramon/Driveway & Sycamore Valley Rd

P.M. Peak
12/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	1299	552	86	646	6	469	6	136	34	24	100
Future Volume (vph)	32	1299	552	86	646	6	469	6	136	34	24	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		5.4	5.4		4.7	4.7	4.7
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86		0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.89		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	6398		3433	1424		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	6398		3433	1424		1770	1863	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.96	0.96	0.96	0.90	0.90	0.90	0.72	0.72	0.72
Adj. Flow (vph)	33	1326	563	90	673	6	521	7	151	47	33	139
RTOR Reduction (vph)	0	0	129	0	1	0	0	114	0	0	0	129
Lane Group Flow (vph)	33	1326	434	90	678	0	521	44	0	47	33	10
Confl. Peds. (#/hr)						5			83			
Confl. Bikes (#/hr)						1						
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2									7
Actuated Green, G (s)	5.6	60.9	60.9	14.2	69.5		34.0	34.0		10.3	10.3	10.3
Effective Green, g (s)	5.6	60.9	60.9	14.2	69.5		34.0	34.0		10.3	10.3	10.3
Actuated g/C Ratio	0.04	0.43	0.43	0.10	0.50		0.24	0.24		0.07	0.07	0.07
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		5.4	5.4		4.7	4.7	4.7
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	70	2211	688	179	3176		833	345		130	137	116
v/s Ratio Prot	0.02	0.26		c0.05	0.11		c0.15	0.03		c0.03	0.02	
v/s Ratio Perm			c0.27									0.01
v/c Ratio	0.47	0.60	0.63	0.50	0.21		0.63	0.13		0.36	0.24	0.09
Uniform Delay, d1	65.8	30.2	30.8	59.6	19.9		47.3	41.4		61.7	61.2	60.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.8	1.2	4.3	0.8	0.2		1.1	0.1		0.6	0.3	0.1
Delay (s)	67.6	31.4	35.1	60.4	20.0		48.4	41.5		62.3	61.5	60.6
Level of Service	E	C	D	E	C		D	D		E	E	E
Approach Delay (s)		33.1			24.7			46.8			61.1	
Approach LOS		C			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			35.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				20.6		
Intersection Capacity Utilization			78.6%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												