Appendix H

Level of Service Calculation Worksheets

Background + Project Conditions

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1193	72	45	991	149	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	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	0.95	1.00
Satd. Flow (prot)	1600	1583	1770	1600	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	1770	1600	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1297	78	49	1077	162	64
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1297	78	49	1077	162	64
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	80.1	80.1	3.4	87.2	13.4	13.4
Effective Green, g (s)	82.1	82.1	3.1	89.2	13.6	13.6
Actuated g/C Ratio	0.74	0.74	0.03	0.81	0.12	0.12
Clearance Time (s)	6.0	6.0	3.7	6.0	4.2	4.2
Vehicle Extension (s)	1.5	1.5	3.0	1.5	2.0	2.0
Lane Grp Cap (vph)	1186	1173	50	1288	217	194
v/s Ratio Prot	c0.81		0.03	c0.67	c0.09	
v/s Ratio Perm		0.05				0.04
v/c Ratio	1.09	0.07	0.98	0.84	0.75	0.33
Uniform Delay, d1	14.4	3.9	53.8	6.4	46.9	44.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	55.6	0.0	118.5	4.7	11.5	0.4
Delay (s)	69.9	3.9	172.3	11.1	58.5	44.8
Level of Service	E	A	F	B	E	D
Approach Delay (s)	66.2			18.1	54.6	
Approach LOS	E			B	D	

Intersection Summary

HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	110.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	1086	25	95	899	245	71	31	77	98	26	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.94			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1770	1600	1553	1703	1600	1583		1714			1784	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.70			0.55	1.00
Satd. Flow (perm)	1770	1863	1553	1703	1863	1583		1227			1014	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	1180	27	103	977	266	77	34	84	107	28	73
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	153	1180	27	103	977	266	0	195	0	0	135	73
Heavy Vehicles (%)	2%	2%	4%	6%	2%	2%	3%	2%	2%	2%	4%	2%
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	12.2	72.6	72.6	8.0	68.4	68.4		21.1			21.1	21.1
Effective Green, g (s)	11.7	74.6	74.6	7.5	70.4	70.4		21.1			21.1	21.1
Actuated g/C Ratio	0.10	0.65	0.65	0.07	0.61	0.61		0.18			0.18	0.18
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0		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)	180	1036	1006	111	978	967		225			186	290
v/s Ratio Prot	c0.09	c0.74		0.06	0.61							
v/s Ratio Perm			0.02			0.17		c0.16			0.13	0.05
v/c Ratio	0.85	1.14	0.03	0.93	1.00	0.28		0.87			0.73	0.25
Uniform Delay, d1	50.9	20.3	7.3	53.6	22.4	10.5		45.7			44.3	40.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	29.4	74.5	0.0	62.3	28.5	0.7		27.6			13.1	0.5
Delay (s)	80.3	94.8	7.3	115.9	50.9	11.2		73.3			57.5	40.7
Level of Service	F	F	A	F	D	B		E			E	D
Approach Delay (s)		91.4			48.0			73.3			51.6	
Approach LOS		F			D			E			D	

Intersection Summary

HCM Average Control Delay	68.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	115.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	1103	11	17	1031	438	14	11	25	498	21	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1770	3200	1568	1770	1669		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1770	3200	1568	1770	1669		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	1199	12	18	1121	476	15	12	27	541	23	213
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	160	1211	0	18	1121	476	15	39	0	541	23	213
Heavy Vehicles (%)	2%	2%	2%	2%	4%	3%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.1	37.9		0.7	30.5	46.8	2.2	2.2		16.3	16.3	16.3
Effective Green, g (s)	8.3	39.9		0.9	32.5	49.4	2.4	2.4		17.6	17.6	17.6
Actuated g/C Ratio	0.11	0.52		0.01	0.42	0.64	0.03	0.03		0.23	0.23	0.23
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	191	1663		21	1354	1009	55	52		787	427	363
v/s Ratio Prot	c0.09	0.38		0.01	c0.35	0.11	0.01	c0.02		c0.16	0.01	
v/s Ratio Perm						0.20						0.13
v/c Ratio	0.84	0.73		0.86	0.83	0.47	0.27	0.75		0.69	0.05	0.59
Uniform Delay, d1	33.6	14.3		37.9	19.7	7.0	36.3	36.9		27.1	23.1	26.4
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	25.7	1.5		129.6	4.2	0.3	1.0	41.1		2.3	0.0	2.0
Delay (s)	59.3	15.8		167.5	23.9	7.3	37.3	78.0		29.4	23.1	28.4
Level of Service	E	B		F	C	A	D	E		C	C	C
Approach Delay (s)		20.9			20.6			66.7			28.9	
Approach LOS		C			C			E			C	

Intersection Summary

HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	76.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	606	1020	1311	10	0	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	0.95	0.95			0.88
Frt	1.00	1.00	1.00			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1600	3200			2760
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1600	3200			2760
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	659	1109	1425	11	0	190
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	659	1109	1436	0	0	190
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot					Over
Protected Phases	5	2	6			5
Permitted Phases						
Actuated Green, G (s)	31.3	79.6	37.7			31.3
Effective Green, g (s)	31.9	79.6	39.7			31.9
Actuated g/C Ratio	0.40	1.00	0.50			0.40
Clearance Time (s)	4.6	2.0	6.0			4.6
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	709	1600	1596			1106
v/s Ratio Prot	c0.37	0.69	c0.45			0.07
v/s Ratio Perm						
v/c Ratio	0.93	0.69	0.90			0.17
Uniform Delay, d1	22.8	0.0	18.1			15.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	18.5	1.3	7.2			0.1
Delay (s)	41.2	1.3	25.3			15.4
Level of Service	D	A	C			B
Approach Delay (s)		16.2	25.3		15.4	
Approach LOS		B	C		B	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	765	3	2	1174	395	9	2	5	113	1	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1663		3433	1863	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1770	1663		3433	1863	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	275	832	3	2	1276	429	10	2	5	123	1	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	275	832	3	2	1276	429	10	7	0	123	1	151
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	17.8	111.3	111.3	0.8	94.1	94.1	1.5	3.1		16.7	17.9	17.9
Effective Green, g (s)	18.0	113.3	113.3	0.8	96.1	96.1	1.7	3.1		16.7	18.1	18.1
Actuated g/C Ratio	0.12	0.76	0.76	0.01	0.64	0.64	0.01	0.02		0.11	0.12	0.12
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	213	1209	1196	9	1026	1015	20	34		382	225	189
v/s Ratio Prot	c0.16	0.52		0.00	c0.80		0.01	0.00		c0.04	0.00	
v/s Ratio Perm			0.00			0.27						c0.10
v/c Ratio	1.29	0.69	0.00	0.22	1.24	0.42	0.50	0.21		0.32	0.00	0.80
Uniform Delay, d1	66.0	9.3	4.5	74.2	26.9	13.2	73.7	72.2		61.4	58.0	64.1
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	161.4	1.9	0.0	12.1	118.0	0.5	30.2	3.0		0.5	0.0	21.1
Delay (s)	227.4	11.2	4.5	86.4	144.9	13.7	103.8	75.2		61.9	58.0	85.2
Level of Service	F	B	A	F	F	B	F	E		E	E	F
Approach Delay (s)		64.8			111.8			92.0			74.7	
Approach LOS		E			F			F			E	

Intersection Summary

HCM Average Control Delay	91.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	149.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	805	46	21	1442	33	51	2	28	30	1	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98			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	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1545	1770	1567			1772	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1545	1369	1567			1344	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	875	50	23	1567	36	55	2	30	33	1	84
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	35	875	50	23	1567	36	55	32	0	0	34	84
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	3.1	107.5	107.5	3.8	108.2	108.2	12.5	12.5			12.5	12.5
Effective Green, g (s)	2.8	109.5	109.5	3.5	110.2	110.2	12.6	12.6			12.6	12.6
Actuated g/C Ratio	0.02	0.80	0.80	0.03	0.80	0.80	0.09	0.09			0.09	0.09
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	36	1273	1260	45	1281	1237	125	143			123	145
v/s Ratio Prot	c0.02	0.55		0.01	c0.98			0.02				
v/s Ratio Perm			0.03			0.02	0.04				0.03	c0.05
v/c Ratio	0.97	0.69	0.04	0.51	1.22	0.03	0.44	0.22			0.28	0.58
Uniform Delay, d1	67.4	6.3	3.0	66.2	13.7	2.8	59.2	58.0			58.3	60.0
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	138.2	1.7	0.0	9.5	107.7	0.0	2.5	0.8			1.2	5.5
Delay (s)	205.6	8.0	3.0	75.7	121.4	2.8	61.6	58.8			59.5	65.5
Level of Service	F	A	A	E	F	A	E	E			E	E
Approach Delay (s)		15.0			118.1			60.6			63.7	
Approach LOS		B			F			E			E	

Intersection Summary

HCM Average Control Delay	78.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	137.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	737	136	240	1290	206	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	3433	1600	1770	1546
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	3433	1600	1770	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	801	148	261	1402	224	270
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	801	148	261	1402	224	270
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	75.5	75.5	11.8	91.0	19.3	19.3
Effective Green, g (s)	77.5	77.5	11.5	93.0	19.0	19.0
Actuated g/C Ratio	0.65	0.65	0.10	0.78	0.16	0.16
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1033	1022	329	1240	280	245
v/s Ratio Prot	0.50		0.08	c0.88	0.13	
v/s Ratio Perm		0.09				c0.17
v/c Ratio	0.78	0.14	0.79	1.13	0.80	1.10
Uniform Delay, d1	15.1	8.3	53.1	13.5	48.7	50.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	0.0	12.0	69.4	15.0	87.5
Delay (s)	18.6	8.4	65.1	82.9	63.7	138.0
Level of Service	B	A	E	F	E	F
Approach Delay (s)	17.0			80.1	104.3	
Approach LOS	B			F	F	

Intersection Summary

HCM Average Control Delay	64.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	936	56	88	1370	13	160	1	199	8	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1600	1583	3400	1600			1757	1583		1783	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1600	1583	3400	1600			1757	1583		1783	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1017	61	96	1489	14	174	1	216	9	1	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1017	61	96	1503	0	0	175	216	0	10	5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	3%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	1.0	92.1	92.1	7.4	98.2			29.8	29.8		3.0	3.0
Effective Green, g (s)	1.0	94.1	94.1	7.1	100.2			29.8	29.8		3.0	3.0
Actuated g/C Ratio	0.01	0.63	0.63	0.05	0.67			0.20	0.20		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	12	1004	993	161	1069			349	314		36	32
v/s Ratio Prot	0.00	0.64		c0.03	c0.94			0.10			c0.01	
v/s Ratio Perm			0.04						c0.14			0.00
v/c Ratio	0.17	1.01	0.06	0.60	1.41			0.50	0.69		0.28	0.16
Uniform Delay, d1	74.1	28.0	10.8	70.0	24.9			53.5	55.8		72.4	72.3
Progression Factor	1.00	1.00	1.00	0.99	1.34			1.00	1.00		1.00	1.00
Incremental Delay, d2	6.5	31.6	0.1	0.5	183.2			1.1	6.1		4.2	2.3
Delay (s)	80.6	59.6	11.0	69.5	216.6			54.6	61.9		76.6	74.5
Level of Service	F	E	B	E	F			D	E		E	E
Approach Delay (s)		56.9			207.8			58.7			75.9	
Approach LOS		E			F			E			E	

Intersection Summary

HCM Average Control Delay	135.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1076	37	73	1345	1	113	1	149	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.97		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
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	1600	1583	3273	1600			1775	1542		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	1600	1583	3273	1600			1775	1542		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1170	40	79	1462	1	123	1	162	1	1	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1170	40	79	1463	0	0	124	162	0	2	1
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.2	104.8	104.8	10.5	114.1			12.3	12.3		5.3	5.3
Effective Green, g (s)	0.9	106.8	106.8	10.2	116.1			12.0	12.0		5.0	5.0
Actuated g/C Ratio	0.01	0.71	0.71	0.07	0.77			0.08	0.08		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	11	1139	1127	223	1238			142	123		61	53
v/s Ratio Prot	0.00	0.73		c0.02	c0.91			0.07			c0.00	
v/s Ratio Perm			0.03						c0.11			0.00
v/c Ratio	0.09	1.03	0.04	0.35	1.18			0.87	1.32		0.03	0.02
Uniform Delay, d1	74.1	21.6	6.4	66.8	17.0			68.2	69.0		70.2	70.1
Progression Factor	0.83	1.16	1.36	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.3	23.5	0.0	0.7	90.3			40.2	188.7		0.2	0.1
Delay (s)	62.5	48.5	8.7	67.5	107.3			108.5	257.7		70.3	70.2
Level of Service	E	D	A	E	F			F	F		E	E
Approach Delay (s)		47.2			105.3			193.0			70.3	
Approach LOS		D			F			F			E	

Intersection Summary

HCM Average Control Delay	90.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	0	0	0	0	7	2	227	0	2	99	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.61	0.92	0.61	0.92	0.92	0.92	0.83	0.83	0.92	0.92	0.59	0.59
Hourly flow rate (vph)	44	0	0	0	0	8	2	273	0	2	168	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											621	
pX, platoon unblocked												
vC, conflicting volume	464	456	174	456	462	273	180			273		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	464	456	174	456	462	273	180			273		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	100	100	100	99	100			100		
cM capacity (veh/h)	502	499	870	513	495	765	1396			1290		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	44	8	276	182
Volume Left	44	0	2	2
Volume Right	0	8	0	12
cSH	502	765	1396	1290
Volume to Capacity	0.09	0.01	0.00	0.00
Queue Length 95th (ft)	7	1	0	0
Control Delay (s)	12.9	9.8	0.1	0.1
Lane LOS	B	A	A	A
Approach Delay (s)	12.9	9.8	0.1	0.1
Approach LOS	B	A		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	17	1208	1060	7	1	359
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.91	0.91	0.70	0.70
Hourly flow rate (vph)	19	1373	1165	8	1	513
Pedestrians		1	1		1	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1174				2578	1167
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1174				2578	1167
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				95	0
cM capacity (veh/h)	595				27	235

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	19	1373	1165	8	1	513
Volume Left	19	0	0	0	1	0
Volume Right	0	0	0	8	0	513
cSH	595	1700	1700	1700	27	235
Volume to Capacity	0.03	0.81	0.69	0.00	0.05	2.18
Queue Length 95th (ft)	3	0	0	0	4	988
Control Delay (s)	11.3	0.0	0.0	0.0	144.1	577.3
Lane LOS	B				F	F
Approach Delay (s)	0.2		0.0		576.1	
Approach LOS					F	

Intersection Summary			
Average Delay	96.3		
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	27	3	5	0	37	17	52	19	1	29	21	227
Peak Hour Factor	0.68	0.68	0.68	0.44	0.44	0.44	0.50	0.50	0.50	0.83	0.83	0.83
Hourly flow rate (vph)	40	4	7	0	84	39	104	38	2	35	25	273

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	51	123	104	40	35	299
Volume Left (vph)	40	0	104	0	35	0
Volume Right (vph)	7	39	0	2	0	273
Hadj (s)	0.13	-0.15	0.53	0.00	0.58	-0.61
Departure Headway (s)	5.3	4.9	5.8	5.3	5.7	4.5
Degree Utilization, x	0.08	0.17	0.17	0.06	0.06	0.37
Capacity (veh/h)	612	668	594	650	605	770
Control Delay (s)	8.7	8.9	8.8	7.4	7.8	9.0
Approach Delay (s)	8.7	8.9	8.4		8.9	
Approach LOS	A	A	A		A	

Intersection Summary			
Delay	8.8		
HCM Level of Service	A		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

13: Hwy 68 WB Ramps & Portola Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	33	12	42	359	5	41	18	203	11	29	28	6
Peak Hour Factor	0.82	0.82	0.82	0.75	0.75	0.75	0.82	0.82	0.82	0.70	0.70	0.70
Hourly flow rate (vph)	40	15	51	479	7	55	22	248	13	41	40	9

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	106	540	22	261	41	49
Volume Left (vph)	40	479	22	0	41	0
Volume Right (vph)	51	55	0	13	0	9
Hadj (s)	-0.18	0.15	0.60	0.00	0.53	-0.06
Departure Headway (s)	5.8	5.4	7.2	6.5	7.5	6.9
Degree Utilization, x	0.17	0.81	0.04	0.47	0.09	0.09
Capacity (veh/h)	562	540	470	508	440	478
Control Delay (s)	10.0	27.5	9.3	14.1	10.0	9.4
Approach Delay (s)	10.0	27.5	13.8		9.7	
Approach LOS	B	D	B		A	

Intersection Summary			
Delay	20.3		
HCM Level of Service	C		
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	239	377	0	0	337	462	157	1	92	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Frpb, ped/bikes	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			
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)	1770	1792			1845	1583		1771	1562			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	1792			1845	1583		1771	1562			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	260	410	0	0	366	502	171	1	100	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	260	410	0	0	366	502	0	172	100	0	0	0
Confl. Peds. (#/hr)			1	1			1		1			
Heavy Vehicles (%)	2%	6%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	17.9	68.2			46.6	46.6		14.3	14.3			
Effective Green, g (s)	17.6	70.2			48.6	48.6		15.2	15.2			
Actuated g/C Ratio	0.19	0.75			0.52	0.52		0.16	0.16			
Clearance Time (s)	3.7	6.0			6.0	6.0		4.9	4.9			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	334	1347			960	824		288	254			
v/s Ratio Prot	c0.15	0.23			0.20							
v/s Ratio Perm						c0.32		0.10	0.06			
v/c Ratio	0.78	0.30			0.38	0.61		0.60	0.39			
Uniform Delay, d1	36.0	3.7			13.4	15.7		36.3	35.0			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	10.9	0.6			0.3	1.3		3.3	1.0			
Delay (s)	46.9	4.3			13.7	17.0		39.6	36.0			
Level of Service	D	A			B	B		D	D			
Approach Delay (s)		20.9			15.6			38.3			0.0	
Approach LOS		C			B			D			A	

Intersection Summary

HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	93.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	437	108	133	360	0	0	0	0	179	6	160
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
Lane Util. Factor		1.00		1.00	1.00						1.00	1.00
Frpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		1755		1770	1845						1741	1524
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		1755		1770	1845						1741	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	475	117	145	391	0	0	0	0	195	7	174
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	592	0	145	391	0	0	0	0	0	202	174
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	5%	7%	2%	3%	2%	2%	2%	2%	4%	2%	6%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		19.3		6.8	29.8						19.3	19.3
Effective Green, g (s)		21.3		6.5	31.8						20.2	20.2
Actuated g/C Ratio		0.36		0.11	0.53						0.34	0.34
Clearance Time (s)		6.0		3.7	6.0						4.9	4.9
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		623		192	978						586	513
v/s Ratio Prot		c0.34		c0.08	0.21							
v/s Ratio Perm											0.12	0.11
v/c Ratio		0.95		0.76	0.40						0.34	0.34
Uniform Delay, d1		18.8		26.0	8.4						14.9	14.9
Progression Factor		1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2		24.3		15.5	1.2						1.6	1.8
Delay (s)		43.2		41.4	9.6						16.5	16.7
Level of Service		D		D	A						B	B
Approach Delay (s)		43.2			18.2			0.0			16.6	
Approach LOS		D			B			A			B	

Intersection Summary

HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	356	0	0	0	0	0	95	1	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	387	0	0	0	0	0	103	1	1
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			0			776	774	0	774	774	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			776	774	0	774	774	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			76			100	100	100	59	100	100
cM capacity (veh/h)	1623			1617			256	251	1085	252	251	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	387	105
Volume Left	0	387	103
Volume Right	0	0	1
cSH	1700	1617	254
Volume to Capacity	0.00	0.24	0.42
Queue Length 95th (ft)	0	23	48
Control Delay (s)	0.0	7.9	29.0
Lane LOS		A	D
Approach Delay (s)	0.0	7.9	29.0
Approach LOS			D

Intersection Summary			
Average Delay	12.4		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	95	0	0	356	0	332
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)	103	0	0	387	0	361
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			103		490	103
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			103		490	103
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	62
cM capacity (veh/h)			1489		537	946

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	103	387	0	361
Volume Left	0	0	0	0
Volume Right	0	0	0	361
cSH	1700	1700	1700	946
Volume to Capacity	0.06	0.23	0.00	0.38
Queue Length 95th (ft)	0	0	0	45
Control Delay (s)	0.0	0.0	0.0	11.1
Lane LOS			A	B
Approach Delay (s)	0.0	0.0	11.1	
Approach LOS			B	

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	4	423	356	83	0	0
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)	4	460	387	90	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	477				855	387
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	477				855	387
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1085				327	661

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	4	460	387	90	0
Volume Left	4	0	0	0	0
Volume Right	0	0	0	90	0
cSH	1085	1700	1700	1700	1700
Volume to Capacity	0.00	0.27	0.23	0.05	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	8.3	0.0	0.0	0.0	0.0
Lane LOS	A				A
Approach Delay (s)	0.1		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	305	666	203	461	462	78	240	904	630	107	647	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	5.3
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		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	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3455		1770	3539	1583	1770	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	1583	3433	3455		1770	3539	1583	1770	3539	1561
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	332	724	221	501	502	85	261	983	685	116	703	251
RTOR Reduction (vph)	0	0	96	0	12	0	0	0	217	0	0	180
Lane Group Flow (vph)	332	724	125	501	575	0	261	983	468	116	703	71
Confl. Peds. (#/hr)	2					2				2		2
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	14.2	26.4	26.4	17.9	30.1		18.8	41.8	41.8	9.3	32.3	32.3
Effective Green, g (s)	13.9	27.7	27.7	17.6	31.4		18.5	43.1	43.1	9.0	33.6	32.3
Actuated g/C Ratio	0.12	0.24	0.24	0.16	0.28		0.16	0.38	0.38	0.08	0.30	0.28
Clearance Time (s)	3.7	5.3	5.3	3.7	5.3		3.7	5.3	5.3	3.7	5.3	5.3
Vehicle Extension (s)	3.0	3.5	3.5	3.0	3.5		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	421	864	387	533	957		289	1345	602	140	1049	445
v/s Ratio Prot	0.10	c0.20		c0.15	c0.17		c0.15	0.28		0.07	0.20	
v/s Ratio Perm			0.08						c0.30			0.05
v/c Ratio	0.79	0.84	0.32	0.94	0.60		0.90	0.73	0.78	0.83	0.67	0.16
Uniform Delay, d1	48.3	40.7	35.2	47.4	35.6		46.6	30.2	30.9	51.4	35.0	30.4
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	9.5	7.3	0.6	24.6	1.1		29.2	3.5	9.5	31.4	3.4	0.8
Delay (s)	57.8	48.0	35.7	72.0	36.7		75.8	33.7	40.5	82.9	38.4	31.2
Level of Service	E	D	D	E	D		E	C	D	F	D	C
Approach Delay (s)		48.4			52.9			41.8			41.6	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	45.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	113.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	568	327	0	0	398	161	1	5	7	163	1	432
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	617	355	0	0	433	175	1	5	8	177	1	470
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												4
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	608			355			2023	2198	355	2121	2110	520
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	608			355			2023	2198	355	2121	2110	520
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	36			100			65	66	99	0	94	16
cM capacity (veh/h)	966			1203			3	16	689	14	18	556

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	617	355	0	608	14	648
Volume Left	617	0	0	0	1	177
Volume Right	0	0	0	175	8	470
cSH	966	1700	1700	1700	20	46
Volume to Capacity	0.64	0.21	0.00	0.36	0.69	14.01
Queue Length 95th (ft)	120	0	0	0	49	Err
Control Delay (s)	15.1	0.0	0.0	0.0	357.7	Err
Lane LOS	C				F	F
Approach Delay (s)	9.6		0.0		357.7	Err
Approach LOS					F	F

Intersection Summary			
Average Delay	2895.1		
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	469	537	21	136	610	213	26	532	221	176	451	761
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	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		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	0.99		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3516		1770	3539	1562	1770	3369		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3516		1770	3539	1562	1770	3369		1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	510	584	23	148	663	232	28	578	240	191	490	827
RTOR Reduction (vph)	0	0	0	0	0	177	0	0	0	0	0	249
Lane Group Flow (vph)	510	607	0	148	663	55	28	818	0	191	490	578
Confl. Peds. (#/hr)			1	2		1	1		2	1		
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						4
Actuated Green, G (s)	14.2	24.1		9.9	19.3	19.3	1.8	23.1		12.7	34.5	34.5
Effective Green, g (s)	14.7	26.6		9.4	21.3	21.3	1.3	25.6		12.2	36.5	36.5
Actuated g/C Ratio	0.16	0.30		0.10	0.24	0.24	0.01	0.29		0.14	0.41	0.41
Clearance Time (s)	4.5	6.5		3.5	6.0	6.0	3.5	6.5		3.5	6.0	6.0
Vehicle Extension (s)	1.0	4.5		1.0	4.5	4.5	1.0	4.5		1.0	4.5	4.5
Lane Grp Cap (vph)	562	1041		185	839	370	26	960		240	757	643
v/s Ratio Prot	c0.15	0.17		0.08	c0.19		0.02	c0.24		0.11	0.26	
v/s Ratio Perm						0.04						c0.37
v/c Ratio	0.91	0.58		0.80	0.79	0.15	1.08	0.85		0.80	0.65	0.90
Uniform Delay, d1	36.9	26.9		39.3	32.2	27.1	44.2	30.3		37.6	21.5	24.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	18.0	2.4		20.3	7.5	0.8	201.3	7.9		15.5	2.4	16.0
Delay (s)	54.9	29.3		59.6	39.6	27.9	245.5	38.2		53.1	23.8	41.0
Level of Service	D	C		E	D	C	F	D		D	C	D
Approach Delay (s)		41.0			39.9			45.1			36.9	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	422	47	2	787	12	1
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)	459	51	2	855	13	1
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			510		916	255
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			510		916	255
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			1052		271	744

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	306	204	287	570	14
Volume Left	0	0	2	0	13
Volume Right	0	51	0	0	1
cSH	1700	1700	1052	1700	285
Volume to Capacity	0.18	0.12	0.00	0.34	0.05
Queue Length 95th (ft)	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.1	0.0	18.3
Lane LOS			A		C
Approach Delay (s)	0.0		0.0		18.3
Approach LOS					C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	729	48	43	1473	71	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	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	0.95	1.00
Satd. Flow (prot)	1600	1583	1770	1600	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	1770	1600	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	792	52	47	1601	77	90
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	792	52	47	1601	77	90
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	86.9	86.9	6.7	97.3	10.8	10.8
Effective Green, g (s)	88.9	88.9	6.4	99.3	11.0	11.0
Actuated g/C Ratio	0.75	0.75	0.05	0.84	0.09	0.09
Clearance Time (s)	6.0	6.0	3.7	6.0	4.2	4.2
Vehicle Extension (s)	1.5	1.5	3.0	1.5	2.0	2.0
Lane Grp Cap (vph)	1202	1190	96	1343	165	147
v/s Ratio Prot	0.49		0.03	c1.00	0.04	
v/s Ratio Perm		0.03				c0.06
v/c Ratio	0.66	0.04	0.49	1.19	0.47	0.61
Uniform Delay, d1	7.2	3.8	54.4	9.5	50.9	51.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.0	3.9	94.1	0.8	5.2
Delay (s)	8.2	3.8	58.3	103.6	51.6	56.8
Level of Service	A	A	E	F	D	E
Approach Delay (s)	8.0			102.3	54.4	
Approach LOS	A			F	D	

Intersection Summary

HCM Average Control Delay	69.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	118.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	707	19	54	1265	171	32	33	138	251	42	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583		1679			1786	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.89			0.54	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583		1498			1000	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	768	21	59	1375	186	35	36	150	273	46	238
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	92	768	21	59	1375	186	0	221	0	0	319	238
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	4.5	40.0	40.0	3.2	38.7	38.7		24.0			24.0	24.0
Effective Green, g (s)	4.0	42.0	42.0	2.7	40.7	40.7		24.0			24.0	24.0
Actuated g/C Ratio	0.05	0.52	0.52	0.03	0.50	0.50		0.30			0.30	0.30
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0		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)	88	833	824	59	807	798		446			297	471
v/s Ratio Prot	c0.05	0.48		0.03	c0.86							
v/s Ratio Perm			0.01			0.12		0.15			c0.32	0.15
v/c Ratio	1.05	0.92	0.03	1.00	1.70	0.23		0.50			1.07	0.51
Uniform Delay, d1	38.4	17.8	9.4	39.0	20.0	11.2		23.4			28.4	23.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	108.9	17.2	0.1	117.2	322.0	0.7		0.9			73.3	0.9
Delay (s)	147.2	35.0	9.5	156.2	342.0	11.9		24.2			101.6	24.3
Level of Service	F	C	A	F	F	B		C			F	C
Approach Delay (s)		46.1			297.4			24.2			68.6	
Approach LOS		D			F			C			E	

Intersection Summary

HCM Average Control Delay	172.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.45		
Actuated Cycle Length (s)	80.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	879	13	29	1309	635	17	25	40	332	17	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		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		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1770	3200	1559	1656	1673		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1770	3200	1559	1656	1673		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	955	14	32	1423	690	18	27	43	361	18	182
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	223	969	0	32	1423	690	18	70	0	361	18	182
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.8	42.9		2.2	36.3	50.6	4.0	4.0		14.3	14.3	14.3
Effective Green, g (s)	9.0	44.9		2.4	38.3	53.2	4.2	4.2		15.6	15.6	15.6
Actuated g/C Ratio	0.11	0.54		0.03	0.46	0.64	0.05	0.05		0.19	0.19	0.19
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	192	1729		51	1475	998	84	85		644	350	297
v/s Ratio Prot	c0.13	0.30		0.02	c0.44	c0.13	0.01	c0.04		0.11	0.01	
v/s Ratio Perm						0.31						0.11
v/c Ratio	1.16	0.56		0.63	0.96	0.69	0.21	0.82		0.56	0.05	0.61
Uniform Delay, d1	37.0	12.6		39.9	21.7	9.7	37.9	39.1		30.6	27.7	31.0
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	115.2	0.3		21.7	15.7	1.9	0.5	43.2		0.9	0.0	3.2
Delay (s)	152.2	12.9		61.6	37.5	11.6	38.3	82.3		31.5	27.7	34.2
Level of Service	F	B		E	D	B	D	F		C	C	C
Approach Delay (s)		39.0			29.5			73.3			32.3	
Approach LOS		D			C			E			C	

Intersection Summary

HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	83.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	184	1067	1396	17	0	577
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	0.95	0.95			0.88
Frt	1.00	1.00	1.00			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	3200	3200			2787
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	3200	3200			2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	1160	1517	18	0	627
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	200	1160	1535	0	0	627
Turn Type	Prot					Over
Protected Phases	5	2	6			5
Permitted Phases						
Actuated Green, G (s)	22.4	78.4	45.4			22.4
Effective Green, g (s)	23.0	78.4	47.4			23.0
Actuated g/C Ratio	0.29	1.00	0.60			0.29
Clearance Time (s)	4.6	2.0	6.0			4.6
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	519	3200	1935			818
v/s Ratio Prot	0.11	0.36	c0.48			c0.23
v/s Ratio Perm						
v/c Ratio	0.39	0.36	0.79			0.77
Uniform Delay, d1	22.1	0.0	11.8			25.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.5	0.1	2.3			4.3
Delay (s)	22.5	0.1	14.1			29.6
Level of Service	C	A	B			C
Approach Delay (s)		3.4	14.1		29.6	
Approach LOS		A	B		C	

Intersection Summary

HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	78.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	948	10	7	1220	118	5	1	3	373	3	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1653		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1770	1653		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1030	11	8	1326	128	5	1	3	405	3	204
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	118	1030	11	8	1326	128	5	4	0	405	3	204
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	7.8	105.7	105.7	0.8	98.5	98.5	0.8	3.3		20.0	22.1	22.1
Effective Green, g (s)	8.0	107.7	107.7	0.8	100.5	100.5	1.0	3.3		20.0	22.3	22.3
Actuated g/C Ratio	0.05	0.73	0.73	0.01	0.68	0.68	0.01	0.02		0.14	0.15	0.15
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	96	1166	1154	10	1088	1076	12	37		465	281	239
v/s Ratio Prot	c0.07	0.64		0.00	c0.83		0.00	0.00		c0.12	0.00	
v/s Ratio Perm			0.01			0.08						c0.13
v/c Ratio	1.23	0.88	0.01	0.80	1.22	0.12	0.42	0.11		0.87	0.01	0.85
Uniform Delay, d1	69.9	15.3	5.5	73.4	23.7	8.2	73.1	70.8		62.6	53.4	61.2
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	165.7	8.6	0.0	169.7	106.9	0.1	35.8	1.3		16.2	0.0	24.9
Delay (s)	235.6	23.9	5.5	243.1	130.6	8.3	108.9	72.1		78.8	53.4	86.0
Level of Service	F	C	A	F	F	A	F	E		E	D	F
Approach Delay (s)		45.3			120.5			92.6			81.1	
Approach LOS		D			F			F			F	

Intersection Summary

HCM Average Control Delay	86.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	147.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	1200	64	13	1202	32	70	5	30	42	4	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1620			1781	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1349	1620			1333	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	1304	70	14	1307	35	76	5	33	46	4	78
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	1304	70	14	1307	35	76	38	0	0	50	78
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	5.3	112.0	112.0	1.6	108.3	108.3	13.1	13.1			13.1	13.1
Effective Green, g (s)	5.0	114.0	114.0	1.3	110.3	110.3	13.2	13.2			13.2	13.2
Actuated g/C Ratio	0.04	0.81	0.81	0.01	0.79	0.79	0.09	0.09			0.09	0.09
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	63	1298	1284	16	1256	1243	127	152			125	149
v/s Ratio Prot	c0.04	c0.81		0.01	c0.82			0.02				
v/s Ratio Perm			0.04			0.02	c0.06				0.04	0.05
v/c Ratio	1.03	1.00	0.05	0.88	1.04	0.03	0.60	0.25			0.40	0.52
Uniform Delay, d1	67.8	13.2	2.6	69.5	15.1	3.3	61.1	59.1			59.9	60.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	122.5	26.1	0.0	161.3	36.6	0.0	7.4	0.9			2.1	3.3
Delay (s)	190.3	39.4	2.6	230.8	51.7	3.3	68.5	59.9			62.0	63.9
Level of Service	F	D	A	F	D	A	E	E			E	E
Approach Delay (s)		44.4			52.3			65.6			63.2	
Approach LOS		D			D			E			E	

Intersection Summary

HCM Average Control Delay	49.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	140.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1131	140	211	1030	217	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	3433	1600	1770	1546
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	3433	1600	1770	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1229	152	229	1120	236	418
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1229	152	229	1120	236	418
Confl. Peds. (#/hr)			1		1	1
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	86.0	86.0	8.3	98.0	32.3	32.3
Effective Green, g (s)	88.0	88.0	8.0	100.0	32.0	32.0
Actuated g/C Ratio	0.63	0.63	0.06	0.71	0.23	0.23
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1006	995	196	1143	405	353
v/s Ratio Prot	c0.77		c0.07	0.70	0.13	
v/s Ratio Perm		0.10				c0.27
v/c Ratio	1.22	0.15	1.17	0.98	0.58	1.18
Uniform Delay, d1	26.0	10.7	66.0	19.0	48.1	54.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	108.8	0.1	117.0	21.6	2.1	108.0
Delay (s)	134.8	10.7	183.0	40.6	50.2	162.0
Level of Service	F	B	F	D	D	F
Approach Delay (s)	121.1			64.8	121.7	
Approach LOS	F			E	F	

Intersection Summary

HCM Average Control Delay	98.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1395	121	157	1159	7	82	1	161	4	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1600	1583	3433	1600			1775	1568		1791	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1600	1583	3433	1600			1775	1568		1791	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1516	132	171	1260	8	89	1	175	4	1	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1516	132	171	1268	0	0	90	175	0	5	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	0.8	92.5	92.5	11.7	103.1			25.4	25.4		2.7	2.7
Effective Green, g (s)	0.8	94.5	94.5	11.4	105.1			25.4	25.4		2.7	2.7
Actuated g/C Ratio	0.01	0.63	0.63	0.08	0.70			0.17	0.17		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	9	1008	997	261	1121			301	266		32	28
v/s Ratio Prot	0.00	c0.95		c0.05	c0.79			0.05			c0.00	
v/s Ratio Perm			0.08						c0.11			0.00
v/c Ratio	0.11	1.50	0.13	0.66	1.13			0.30	0.66		0.16	0.14
Uniform Delay, d1	74.2	27.8	11.2	67.4	22.5			54.5	58.2		72.5	72.5
Progression Factor	1.00	1.00	1.00	1.04	0.71			1.00	1.00		1.00	1.00
Incremental Delay, d2	5.4	232.0	0.3	0.5	60.2			0.6	5.8		2.3	2.3
Delay (s)	79.7	259.7	11.5	70.3	76.3			55.1	64.0		74.8	74.9
Level of Service	E	F	B	E	E			E	E		E	E
Approach Delay (s)		239.8			75.6			61.0			74.8	
Approach LOS		F			E			E			E	

Intersection Summary

HCM Average Control Delay	154.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1454	114	157	1241	1	73	2	116	1	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.97		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
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	1600	1583	3273	1600			1776	1539		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	1600	1583	3273	1600			1776	1539		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1580	124	171	1349	1	79	2	126	1	1	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1580	124	171	1350	0	0	81	126	0	2	2
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	100.8	100.8	17.5	117.0			9.3	9.3		5.3	5.3
Effective Green, g (s)	1.0	102.8	102.8	17.2	119.0			9.0	9.0		5.0	5.0
Actuated g/C Ratio	0.01	0.69	0.69	0.11	0.79			0.06	0.06		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	12	1097	1085	375	1269			107	92		61	53
v/s Ratio Prot	0.00	c0.99		c0.05	c0.84			0.05			0.00	
v/s Ratio Perm			0.08						c0.08			c0.00
v/c Ratio	0.17	1.44	0.11	0.46	1.06			0.76	1.37		0.03	0.04
Uniform Delay, d1	74.1	23.6	8.1	62.0	15.5			69.4	70.5		70.2	70.2
Progression Factor	1.13	1.46	0.95	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	198.6	0.0	0.6	44.1			24.8	220.9		0.2	0.2
Delay (s)	84.3	233.1	7.7	62.7	59.6			94.2	291.4		70.3	70.4
Level of Service	F	F	A	E	E			F	F		E	E
Approach Delay (s)		216.6			60.0			214.2			70.4	
Approach LOS		F			E			F			E	

Intersection Summary

HCM Average Control Delay	147.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	0	0	0	0	4	1	167	0	8	226	37
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.92	0.71	0.92	0.92	0.92	0.80	0.80	0.92	0.92	0.87	0.87
Hourly flow rate (vph)	28	0	0	0	0	4	1	209	0	9	260	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											621	
pX, platoon unblocked												
vC, conflicting volume	514	510	281	510	531	209	302			209		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	514	510	281	510	531	209	302			209		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	100	100	100	99	100			99		
cM capacity (veh/h)	466	463	758	471	451	832	1259			1362		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	28	4	210	311
Volume Left	28	0	1	9
Volume Right	0	4	0	43
cSH	466	832	1259	1362
Volume to Capacity	0.06	0.01	0.00	0.01
Queue Length 95th (ft)	5	0	0	0
Control Delay (s)	13.2	9.4	0.1	0.3
Lane LOS	B	A	A	A
Approach Delay (s)	13.2	9.4	0.1	0.3
Approach LOS	B	A		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	61	1509	1356	42	2	43
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)	66	1640	1474	46	2	47
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	1520				3247	1474
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1520				3247	1474
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				75	70
cM capacity (veh/h)	439				9	155

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	66	1640	1474	46	2	47
Volume Left	66	0	0	0	2	0
Volume Right	0	0	0	46	0	47
cSH	439	1700	1700	1700	9	155
Volume to Capacity	0.15	0.96	0.87	0.03	0.25	0.30
Queue Length 95th (ft)	13	0	0	0	14	30
Control Delay (s)	14.6	0.0	0.0	0.0	517.2	37.8
Lane LOS	B				F	E
Approach Delay (s)	0.6		0.0		59.1	
Approach LOS					F	

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	32	14	25	2	25	16	64	29	2	66	90	104
Peak Hour Factor	0.90	0.90	0.90	0.71	0.71	0.71	0.57	0.57	0.57	0.87	0.87	0.87
Hourly flow rate (vph)	36	16	28	3	35	23	112	51	4	76	103	120

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	79	61	112	54	76	223
Volume Left (vph)	36	3	112	0	76	0
Volume Right (vph)	28	23	0	4	0	120
Hadj (s)	-0.09	-0.18	0.53	-0.01	0.53	-0.34
Departure Headway (s)	5.0	4.9	5.7	5.1	5.6	4.7
Degree Utilization, x	0.11	0.08	0.18	0.08	0.12	0.29
Capacity (veh/h)	662	666	611	672	622	742
Control Delay (s)	8.6	8.3	8.7	7.4	8.1	8.4
Approach Delay (s)	8.6	8.3	8.3		8.3	
Approach LOS	A	A	A		A	

Intersection Summary			
Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

13: Hwy 68 WB Ramps & Portola Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	32	9	22	178	29	128	21	100	22	27	29	20
Peak Hour Factor	0.69	0.69	0.69	0.87	0.87	0.87	0.81	0.81	0.81	0.79	0.79	0.79
Hourly flow rate (vph)	46	13	32	205	33	147	26	123	27	34	37	25

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	91	385	26	151	34	62
Volume Left (vph)	46	205	26	0	34	0
Volume Right (vph)	32	147	0	27	0	25
Hadj (s)	-0.06	-0.09	0.53	-0.09	0.53	-0.25
Departure Headway (s)	5.1	4.7	6.4	5.8	6.5	5.7
Degree Utilization, x	0.13	0.50	0.05	0.24	0.06	0.10
Capacity (veh/h)	644	734	524	580	504	571
Control Delay (s)	8.9	12.4	8.5	9.4	8.8	8.2
Approach Delay (s)	8.9	12.4	9.3		8.4	
Approach LOS	A	B	A		A	

Intersection Summary			
Delay	10.7		
HCM Level of Service	B		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	231	656	0	0	275	251	138	1	144	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Frpb, ped/bikes	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			
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)	1752	1863			1863	1553		1770	1562			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1752	1863			1863	1553		1770	1562			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	251	713	0	0	299	273	150	1	157	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	251	713	0	0	299	273	0	151	157	0	0	0
Confl. Peds. (#/hr)			2				2		2			
Heavy Vehicles (%)	3%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	10.6	29.5			15.2	15.2		8.5	8.5			
Effective Green, g (s)	10.3	31.5			17.2	17.2		9.4	9.4			
Actuated g/C Ratio	0.21	0.64			0.35	0.35		0.19	0.19			
Clearance Time (s)	3.7	6.0			6.0	6.0		4.9	4.9			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	369	1200			655	546		340	300			
v/s Ratio Prot	0.14	c0.38			0.16							
v/s Ratio Perm						0.18		0.09	c0.10			
v/c Ratio	0.68	0.59			0.46	0.50		0.44	0.52			
Uniform Delay, d1	17.8	5.0			12.2	12.5		17.4	17.7			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	5.1	2.2			0.5	0.7		0.9	1.6			
Delay (s)	22.9	7.2			12.7	13.2		18.4	19.4			
Level of Service	C	A			B	B		B	B			
Approach Delay (s)		11.3			13.0			18.9			0.0	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	48.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	500	166	118	295	0	0	0	0	387	0	273
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
Lane Util. Factor		1.00		1.00	1.00						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		1776		1770	1845						1770	1583
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		1776		1770	1845						1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	180	128	321	0	0	0	0	421	0	297
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	723	0	128	321	0	0	0	0	0	421	297
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	2%	3%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		30.0		6.3	40.0						19.1	19.1
Effective Green, g (s)		32.0		6.0	42.0						20.0	20.0
Actuated g/C Ratio		0.46		0.09	0.60						0.29	0.29
Clearance Time (s)		6.0		3.7	6.0						4.9	4.9
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		812		152	1107						506	452
v/s Ratio Prot		c0.41		c0.07	0.17							
v/s Ratio Perm											0.24	0.19
v/c Ratio		0.89		0.84	0.29						0.83	0.66
Uniform Delay, d1		17.4		31.5	6.8						23.4	22.0
Progression Factor		1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2		11.9		32.3	0.7						14.7	7.3
Delay (s)		29.3		63.8	7.4						38.2	29.3
Level of Service		C		E	A						D	C
Approach Delay (s)		29.3			23.5			0.0			34.5	
Approach LOS		C			C			A			C	

Intersection Summary

HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	3	5	431	6	0	0	0	0	93	1	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3	5	468	7	0	0	0	0	101	1	3
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	7			9			953	949	6	949	952	7
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			9			953	949	6	949	952	7
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			71			100	100	100	44	99	100
cM capacity (veh/h)	1614			1605			183	184	1077	179	184	1076

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	9	475	105
Volume Left	0	468	101
Volume Right	5	0	3
cSH	1700	1605	184
Volume to Capacity	0.01	0.29	0.57
Queue Length 95th (ft)	0	31	77
Control Delay (s)	0.0	8.1	48.0
Lane LOS		A	E
Approach Delay (s)	0.0	8.1	48.0
Approach LOS			E

Intersection Summary			
Average Delay	15.1		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	96	0	0	430	7	270
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)	104	0	0	467	8	293
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			104		572	104
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			104		572	104
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			100		98	69
cM capacity (veh/h)			1487		482	934

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	104	467	8	293
Volume Left	0	0	8	0
Volume Right	0	0	0	293
cSH	1700	1700	482	934
Volume to Capacity	0.06	0.27	0.02	0.31
Queue Length 95th (ft)	0	0	1	34
Control Delay (s)	0.0	0.0	12.6	10.6
Lane LOS			B	B
Approach Delay (s)	0.0	0.0	10.7	
Approach LOS			B	

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	6	360	421	145	0	9
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)	7	391	458	158	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	615				862	458
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	615				862	458
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)	964				323	603

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SW 1
Volume Total	7	391	458	158	10
Volume Left	7	0	0	0	0
Volume Right	0	0	0	158	10
cSH	964	1700	1700	1700	151
Volume to Capacity	0.01	0.23	0.27	0.09	0.06
Queue Length 95th (ft)	1	0	0	0	5
Control Delay (s)	8.8	0.0	0.0	0.0	30.5
Lane LOS	A				D
Approach Delay (s)	0.1		0.0		30.5
Approach LOS					D

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	482	542	186	690	727	127	234	880	513	95	942	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	5.3
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		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	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1558	3433	3452		1770	3539	1561	1770	3539	1559
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	3433	3452		1770	3539	1561	1770	3539	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	524	589	202	750	790	138	254	957	558	103	1024	407
RTOR Reduction (vph)	0	0	97	0	11	0	0	0	311	0	0	239
Lane Group Flow (vph)	524	589	105	750	917	0	254	957	247	103	1024	168
Confl. Peds. (#/hr)	4		3	2		3	3		2	3		3
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	20.1	27.7	27.7	26.3	33.9		18.7	40.8	40.8	11.9	34.0	34.0
Effective Green, g (s)	19.8	29.0	29.0	26.0	35.2		18.4	42.1	42.1	11.6	35.3	34.0
Actuated g/C Ratio	0.16	0.23	0.23	0.21	0.28		0.15	0.34	0.34	0.09	0.28	0.27
Clearance Time (s)	3.7	5.3	5.3	3.7	5.3		3.7	5.3	5.3	3.7	5.3	5.3
Vehicle Extension (s)	3.0	3.5	3.5	3.0	3.5		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	545	823	362	716	974		261	1195	527	165	1002	425
v/s Ratio Prot	0.15	0.17		c0.22	c0.27		c0.14	0.27		0.06	c0.29	
v/s Ratio Perm			0.07						0.16			0.11
v/c Ratio	0.96	0.72	0.29	1.05	0.94		0.97	0.80	0.47	0.62	1.02	0.39
Uniform Delay, d1	52.1	44.1	39.4	49.4	43.7		52.9	37.5	32.5	54.5	44.7	37.0
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	28.9	3.1	0.5	46.7	16.6		47.9	5.7	3.0	7.2	34.1	2.7
Delay (s)	81.0	47.1	39.9	96.1	60.3		100.8	43.2	35.5	61.6	78.8	39.7
Level of Service	F	D	D	F	E		F	D	D	E	E	D
Approach Delay (s)		59.5			76.3			49.0			67.3	
Approach LOS		E			E			D			E	

Intersection Summary

HCM Average Control Delay	62.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	124.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	716	512	1	6	519	126	0	1	1	168	1	795
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	778	557	1	7	564	137	0	1	1	183	1	864
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												4
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	701			558			2691	2828	557	2760	2760	633
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	701			558			2691	2828	557	2760	2760	633
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	13			99			0	53	100	0	57	0
cM capacity (veh/h)	896			1013			0	2	530	2	3	480

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	778	558	7	701	2	1048
Volume Left	778	0	7	0	0	183
Volume Right	0	1	0	137	1	864
cSH	896	1700	1013	1700	5	13
Volume to Capacity	0.87	0.33	0.01	0.41	0.47	83.65
Queue Length 95th (ft)	281	0	0	0	19	Err
Control Delay (s)	28.9	0.0	8.6	0.0	1098.5	Err
Lane LOS	D		A		F	F
Approach Delay (s)	16.8		0.1		1098.5	Err
Approach LOS					F	F

Intersection Summary			
Average Delay	3394.9		
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	739	602	18	306	653	359	36	715	282	204	707	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3523		1770	3539	1583	1770	3389		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3523		1770	3539	1583	1770	3389		1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	803	654	20	333	710	390	39	777	307	222	768	522
RTOR Reduction (vph)	0	0	0	0	0	182	0	0	0	0	0	93
Lane Group Flow (vph)	803	674	0	333	710	208	39	1084	0	222	768	429
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						4
Actuated Green, G (s)	32.3	34.3		25.9	27.4	27.4	3.0	30.5		17.5	45.5	45.5
Effective Green, g (s)	32.8	36.8		25.4	29.4	29.4	2.5	33.0		17.0	47.5	47.5
Actuated g/C Ratio	0.26	0.29		0.20	0.23	0.23	0.02	0.26		0.13	0.37	0.37
Clearance Time (s)	4.5	6.5		3.5	6.0	6.0	3.5	6.5		3.5	6.0	6.0
Vehicle Extension (s)	1.0	4.5		1.0	4.5	4.5	1.0	4.5		1.0	4.5	4.5
Lane Grp Cap (vph)	878	1011		351	812	363	35	872		235	690	587
v/s Ratio Prot	c0.23	0.19		0.19	c0.20		0.02	c0.32		0.13	c0.41	
v/s Ratio Perm						0.13						0.27
v/c Ratio	0.91	0.67		0.95	0.87	0.57	1.11	1.24		0.94	1.11	0.73
Uniform Delay, d1	46.3	40.3		50.8	47.6	43.8	62.8	47.6		55.1	40.3	34.8
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	13.6	3.5		34.1	12.6	6.4	188.3	119.1		42.9	69.6	5.3
Delay (s)	59.9	43.8		84.9	60.2	50.3	251.2	166.7		98.0	110.0	40.1
Level of Service	E	D		F	E	D	F	F		F	F	D
Approach Delay (s)		52.6			63.3			169.6			84.1	
Approach LOS		D			E			F			F	

Intersection Summary

HCM Average Control Delay	87.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	128.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	766	34	2	468	58	3
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)	833	37	2	509	63	3
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			870		1110	435
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			870		1110	435
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		69	99
cM capacity (veh/h)			771		203	569

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	555	314	172	339	66
Volume Left	0	0	2	0	63
Volume Right	0	37	0	0	3
cSH	1700	1700	771	1700	210
Volume to Capacity	0.33	0.18	0.00	0.20	0.32
Queue Length 95th (ft)	0	0	0	0	32
Control Delay (s)	0.0	0.0	0.2	0.0	29.9
Lane LOS			A		D
Approach Delay (s)	0.0		0.1		29.9
Approach LOS					D

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCS+: Two-Lane Highways Release 5.2

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Back+ Project AM
Highway	68
From/To	San Benancio Rd. / Torero Dr.
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	4	%
Segment length	1.4	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V 2645 veh/h
Directional split 54 / 46 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	2887	pc/h
Highest directional split proportion (note-2)	1559	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	59.0	mi/h
Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATS	35.7	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	2875	pc/h
Highest directional split proportion (note-2)	1553	
Base percent time-spent-following, BPTSF	92.0	%
Adj.for directional distribution and no-passing zones, fd/np	2.0	
Percent time-spent-following, PTSF	94.1	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.90	
Peak 15-min vehicle-miles of travel, VMT15	1006	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3703	veh-mi
Peak 15-min total travel time, TT15	28.1	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.2

Phone: Fax:
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Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Back+Project AM
Highway	68
From/To	Torero Dr. / Begin-End Freeway
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	4	%
Segment length	0.6	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	1	/mi
Up/down		%			

Two-way hourly volume, V 2276 veh/h
Directional split 53 / 47 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	2484	pc/h
Highest directional split proportion (note-2)	1317	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	0.3	mi/h
Free-flow speed, FFS	59.8	mi/h
Adjustment for no-passing zones, fnp	1.1	mi/h
Average travel speed, ATS	39.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	2474	pc/h
Highest directional split proportion (note-2)	1311	
Base percent time-spent-following, BPTSF	88.6	%
Adj.for directional distribution and no-passing zones, fd/np	2.8	
Percent time-spent-following, PTSF	91.4	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.78	
Peak 15-min vehicle-miles of travel, VMT15	371	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1366	veh-mi
Peak 15-min total travel time, TT15	9.4	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.2

Phone:
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Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Background + Project AM
Highway	218
From/To	Highway 68 / General Jim Moore
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.7	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	9	/mi
Up/down		%			

Two-way hourly volume, V 1311 veh/h
Directional split 54 / 46 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.998	
Two-way flow rate,(note-1) vp	1428	pc/h
Highest directional split proportion (note-2)	771	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.3	mi/h
Free-flow speed, FFS	57.8	mi/h
Adjustment for no-passing zones, fnp	1.7	mi/h
Average travel speed, ATS	45.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1425	pc/h
Highest directional split proportion (note-2)	770	
Base percent time-spent-following, BPTSF	71.4	%
Adj.for directional distribution and no-passing zones, fd/np	7.8	
Percent time-spent-following, PTSF	79.3	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.45	
Peak 15-min vehicle-miles of travel, VMT15	249	veh-mi
Peak-hour vehicle-miles of travel, VMT60	918	veh-mi
Peak 15-min total travel time, TT15	5.5	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.2

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Background + Project AM
Highway	Reservation Road
From/To	Davis Road / Highway 68
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	6	%
Segment length	1.8	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	7	/mi
Up/down		%			

Two-way hourly volume, V	1056	veh/h	
Directional split	51 / 49	%	

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.2	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.988	
Two-way flow rate,(note-1) vp	1162	pc/h
Highest directional split proportion (note-2)	593	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.8	mi/h
Free-flow speed, FFS	58.3	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATS	47.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.994	
Two-way flow rate,(note-1) vp	1155	pc/h
Highest directional split proportion (note-2)	589	
Base percent time-spent-following, BPTSF	63.8	%
Adj.for directional distribution and no-passing zones, fd/np	10.9	
Percent time-spent-following, PTSF	74.7	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.36	
Peak 15-min vehicle-miles of travel, VMT15	517	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1901	veh-mi
Peak 15-min total travel time, TT15	11.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Background + Project AM
Highway	Davis Road
From/To	Reservation Road / Blanco Road
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	3	%
Segment length	2.1	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	3	/mi
Up/down		%			

Two-way hourly volume, V 1387 veh/h
Directional split 53 / 47 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.997	
Two-way flow rate,(note-1) vp	1512	pc/h
Highest directional split proportion (note-2)	801	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	0.8	mi/h
Free-flow speed, FFS	59.3	mi/h
Adjustment for no-passing zones, fnp	1.6	mi/h
Average travel speed, ATS	45.9	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1508	pc/h
Highest directional split proportion (note-2)	799	
Base percent time-spent-following, BPTSF	73.4	%
Adj.for directional distribution and no-passing zones, fd/np	7.3	
Percent time-spent-following, PTSF	80.7	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.47	
Peak 15-min vehicle-miles of travel, VMT15	791	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2913	veh-mi
Peak 15-min total travel time, TT15	17.2	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Back+Project PM
Highway	68
From/To	San Benancio Rd. / Torero Dr.
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	4	%
Segment length	1.4	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V 2970 veh/h
Directional split 53 / 47 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	3241	pc/h
Highest directional split proportion (note-2)	1718	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	59.0	mi/h
Adjustment for no-passing zones, fnp		mi/h
Average travel speed, ATS		mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	3228	pc/h
Highest directional split proportion (note-2)	1711	
Base percent time-spent-following, BPTSF	94.1	%
Adj.for directional distribution and no-passing zones, fd/np	1.6	
Percent time-spent-following, PTSF	95.8	%

Level of Service and Other Performance Measures

Level of service, LOS		
Volume to capacity ratio, v/c	1.01	
Peak 15-min vehicle-miles of travel, VMT15	1130	veh-mi
Peak-hour vehicle-miles of travel, VMT60	4158	veh-mi
Peak 15-min total travel time, TT15		veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Back+Project PM
Highway	68
From/To	Torero Dr. / Begin-End Freeway
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	4	%
Segment length	0.6	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	1	/mi
Up/down		%			

Two-way hourly volume, V	2909	veh/h		
Directional split	52 / 48	%		

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	3175	pc/h
Highest directional split proportion (note-2)	1651	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	0.3	mi/h
Free-flow speed, FFS	59.8	mi/h
Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATS	34.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	3162	pc/h
Highest directional split proportion (note-2)	1644	
Base percent time-spent-following, BPTSF	93.8	%
Adj.for directional distribution and no-passing zones, fd/np	1.6	
Percent time-spent-following, PTSF	95.4	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.99	
Peak 15-min vehicle-miles of travel, VMT15	474	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1745	veh-mi
Peak 15-min total travel time, TT15	13.8	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Back + Alternative Project PM
Highway	218
From/To	Highway 68 / General Jim Moore
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.7	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	9	/mi
Up/down		%			

Two-way hourly volume, v 1380 veh/h
Directional split 63 / 37 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.998	
Two-way flow rate,(note-1) vp	1503	pc/h
Highest directional split proportion (note-2)	947	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.3	mi/h
Free-flow speed, FFS	57.8	mi/h
Adjustment for no-passing zones, fnp	1.6	mi/h
Average travel speed, ATS	44.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1500	pc/h
Highest directional split proportion (note-2)	945	
Base percent time-spent-following, BPTSF	73.2	%
Adj.for directional distribution and no-passing zones, fd/np	7.5	
Percent time-spent-following, PTSF	80.8	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.47	
Peak 15-min vehicle-miles of travel, VMT15	262	veh-mi
Peak-hour vehicle-miles of travel, VMT60	966	veh-mi
Peak 15-min total travel time, TT15	5.9	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Background + Project PM
Highway	Reservation Road
From/To	Davis Road / Highway 68
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	6	%
Segment length	1.8	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	7	/mi
Up/down		%			

Two-way hourly volume, V 1322 veh/h
Directional split 51 / 49 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.994	
Two-way flow rate,(note-1) vp	1446	pc/h
Highest directional split proportion (note-2)	737	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.8	mi/h
Free-flow speed, FFS	58.3	mi/h
Adjustment for no-passing zones, fnp	1.7	mi/h
Average travel speed, ATS	45.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1437	pc/h
Highest directional split proportion (note-2)	733	
Base percent time-spent-following, BPTSF	71.7	%
Adj.for directional distribution and no-passing zones, fd/np	7.7	
Percent time-spent-following, PTSF	79.4	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.45	
Peak 15-min vehicle-miles of travel, VMT15	647	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2380	veh-mi
Peak 15-min total travel time, TT15	14.3	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	LM
Agency/Co.	HMM
Date Performed	10/15/2008
Analysis Time Period	Background + Project PM
Highway	Davis Road
From/To	Reservation Road / Blanco Road
Jurisdiction	
Analysis Year	
Description 252572	

Input Data

Highway class Class 1					
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	3	%
Segment length	2.1	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	3	/mi
Up/down		%			

Two-way hourly volume, v 2064 veh/h
Directional split 56 / 44 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.997	
Two-way flow rate,(note-1) vp	2250	pc/h
Highest directional split proportion (note-2)	1260	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	0.8	mi/h
Free-flow speed, FFS	59.3	mi/h
Adjustment for no-passing zones, fnp	1.1	mi/h
Average travel speed, ATS	40.7	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	2243	pc/h
Highest directional split proportion (note-2)	1256	
Base percent time-spent-following, BPTSF	86.1	%
Adj.for directional distribution and no-passing zones, fd/np	3.5	
Percent time-spent-following, PTSF	89.6	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.70	
Peak 15-min vehicle-miles of travel, VMT15	1178	veh-mi
Peak-hour vehicle-miles of travel, VMT60	4334	veh-mi
Peak 15-min total travel time, TT15	29.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.