Appendix C

Level of Service Calculation Worksheets

Existing Conditions Mitigated

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1035	72	45	886	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	0.91	0.91	0.58	0.58
Adj. Flow (vph)	1125	78	49	974	257	102
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1125	78	49	974	257	102
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	87.1	87.1	3.7	94.5	19.5	19.5
Effective Green, g (s)	89.1	89.1	3.4	96.5	19.7	19.7
Actuated g/C Ratio	0.72	0.72	0.03	0.78	0.16	0.16
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)	1148	1136	48	1243	281	251
v/s Ratio Prot	c0.70		0.03	c0.61	c0.15	
v/s Ratio Perm		0.05				0.06
v/c Ratio	0.98	0.07	1.02	0.78	0.91	0.41
Uniform Delay, d1	16.7	5.2	60.4	7.9	51.4	47.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.5	0.0	136.0	3.1	31.6	0.4
Delay (s)	38.2	5.2	196.4	10.9	83.0	47.4
Level of Service	D	A	F	B	F	D
Approach Delay (s)	36.0			19.8	72.9	
Approach LOS	D			B	E	

Intersection Summary

HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	124.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.4%	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)	141	929	24	93	796	243	68	31	70	96	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	0.95	1.00	1.00	0.95	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	3200	1553	1703	3200	1583		1717			1785	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.73			0.54	1.00
Satd. Flow (perm)	1770	3200	1553	1703	3200	1583		1279			998	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.91	0.91	0.91	0.60	0.60	0.60	0.84	0.84	0.84
Adj. Flow (vph)	162	1068	28	102	875	267	113	52	117	114	31	80
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	162	1068	28	102	875	267	0	282	0	0	145	80
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)	14.5	53.6	53.6	11.2	50.3	50.3		26.6			26.6	26.6
Effective Green, g (s)	14.0	55.6	55.6	10.7	52.3	52.3		26.6			26.6	26.6
Actuated g/C Ratio	0.13	0.53	0.53	0.10	0.50	0.50		0.25			0.25	0.25
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)	236	1696	823	174	1595	789		324			253	401
v/s Ratio Prot	c0.09	c0.33		0.06	0.27							
v/s Ratio Perm			0.02			0.17		c0.22			0.15	0.05
v/c Ratio	0.69	0.63	0.03	0.59	0.55	0.34		0.87			0.57	0.20
Uniform Delay, d1	43.4	17.4	11.8	45.0	18.2	15.9		37.5			34.2	30.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	8.0	1.8	0.1	5.0	1.4	1.2		21.6			3.1	0.2
Delay (s)	51.4	19.2	11.9	50.0	19.5	17.0		59.1			37.3	31.0
Level of Service	D	B	B	D	B	B		E			D	C
Approach Delay (s)		23.2			21.5			59.1			35.1	
Approach LOS		C			C			E			D	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	220	702	1092	323	86	111
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	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1600	3200	1583	1770	1568
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1600	3200	1583	1770	1568
Peak-hour factor, PHF	0.92	0.92	0.93	0.93	0.55	0.55
Adj. Flow (vph)	239	763	1174	347	156	202
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	239	763	1174	347	156	202
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	16.9	61.7	40.6	40.6	18.3	18.3
Effective Green, g (s)	17.1	63.7	42.6	42.6	18.5	18.5
Actuated g/C Ratio	0.19	0.71	0.47	0.47	0.21	0.21
Clearance Time (s)	4.2	6.0	6.0	6.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	4.5	3.5	3.5
Lane Grp Cap (vph)	336	1130	1511	748	363	322
v/s Ratio Prot	0.14	c0.48	c0.37		0.09	
v/s Ratio Perm				0.22		c0.13
v/c Ratio	0.71	0.68	0.78	0.46	0.43	0.63
Uniform Delay, d1	34.2	7.4	19.8	16.1	31.3	32.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.9	1.9	2.9	0.8	1.0	4.0
Delay (s)	42.1	9.4	22.7	16.9	32.2	36.7
Level of Service	D	A	C	B	C	D
Approach Delay (s)		17.2	21.4		34.7	
Approach LOS		B	C		C	

Intersection Summary

HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.1%	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)	27	715	46	21	1301	29	51	2	28	19	1	63
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	0.95	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	0.99			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	3200	1548	1770	1580			1776	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00			0.75	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1548	1384	1580			1398	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.95	0.95	0.95	0.88	0.88	0.88	0.90	0.90	0.90
Adj. Flow (vph)	31	822	53	22	1369	31	58	2	32	21	1	70
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	31	822	53	22	1369	31	58	34	0	0	22	70
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)	2.5	59.1	59.1	2.2	58.8	58.8	9.2	9.2			9.2	9.2
Effective Green, g (s)	2.2	61.1	61.1	1.9	60.8	60.8	9.3	9.3			9.3	9.3
Actuated g/C Ratio	0.03	0.72	0.72	0.02	0.72	0.72	0.11	0.11			0.11	0.11
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)	46	1160	1147	40	2308	1116	153	174			154	175
v/s Ratio Prot	c0.02	c0.51		0.01	0.43			0.02				
v/s Ratio Perm			0.03			0.02	0.04				0.02	c0.04
v/c Ratio	0.67	0.71	0.05	0.55	0.59	0.03	0.38	0.20			0.14	0.40
Uniform Delay, d1	40.7	6.6	3.3	40.8	5.7	3.3	34.8	34.1			33.9	34.9
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	32.6	2.2	0.0	15.3	0.5	0.0	1.6	0.6			0.4	1.5
Delay (s)	73.3	8.7	3.3	56.1	6.2	3.4	36.4	34.6			34.3	36.4
Level of Service	E	A	A	E	A	A	D	C			C	D
Approach Delay (s)		10.6			6.9			35.7			35.9	
Approach LOS		B			A			D			D	

Intersection Summary

HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	84.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	636	136	228	1145	206	233
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	0.95	1.00	1.00	0.95	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	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)	3200	1583	1770	3200	1770	1563
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	1770	3200	1770	1563
Peak-hour factor, PHF	0.96	0.96	0.98	0.98	0.87	0.87
Adj. Flow (vph)	662	142	233	1168	237	268
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	662	142	233	1168	237	268
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)	18.2	18.2	13.4	35.3	17.7	17.7
Effective Green, g (s)	20.2	20.2	13.1	37.3	17.4	17.4
Actuated g/C Ratio	0.32	0.32	0.21	0.59	0.28	0.28
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)	1031	510	370	1904	491	434
v/s Ratio Prot	0.21		0.13	c0.36	0.13	
v/s Ratio Perm		0.09				c0.17
v/c Ratio	0.64	0.28	0.63	0.61	0.48	0.62
Uniform Delay, d1	18.2	15.8	22.6	8.1	18.9	19.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2	2.9	0.5	0.8	2.6
Delay (s)	19.4	16.0	25.5	8.6	19.6	22.4
Level of Service	B	B	C	A	B	C
Approach Delay (s)	18.8			11.4	21.1	
Approach LOS	B			B	C	

Intersection Summary

HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	62.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	824	52	86	1219	154	196
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	0.95	1.00	1.00	0.95	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)	3200	1583	1752	3200	1752	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	1752	3200	1752	1583
Peak-hour factor, PHF	0.85	0.85	0.98	0.98	0.90	0.90
Adj. Flow (vph)	969	61	88	1244	171	218
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	969	61	88	1244	171	218
Heavy Vehicles (%)	2%	2%	3%	2%	3%	2%
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	87.1	107.2	9.4	100.2	20.1	20.1
Effective Green, g (s)	89.1	106.6	9.1	102.2	19.8	19.8
Actuated g/C Ratio	0.69	0.82	0.07	0.79	0.15	0.15
Clearance Time (s)	6.0	3.7	3.7	6.0	3.7	3.7
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5
Lane Grp Cap (vph)	2193	1298	123	2516	267	241
v/s Ratio Prot	0.30	0.01	c0.05	c0.39	0.10	
v/s Ratio Perm		0.03				c0.14
v/c Ratio	0.44	0.05	0.72	0.49	0.64	0.90
Uniform Delay, d1	9.2	2.2	59.2	4.9	51.8	54.2
Progression Factor	1.00	1.00	0.90	1.18	1.00	1.00
Incremental Delay, d2	0.6	0.0	14.7	0.6	4.6	33.4
Delay (s)	9.9	2.2	67.9	6.3	56.3	87.6
Level of Service	A	A	E	A	E	F
Approach Delay (s)	9.4			10.4	73.9	
Approach LOS	A			B	E	

Intersection Summary

HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
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	964	34	60	1199	1	105	0	127	0	0	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
Lane Util. Factor		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			1.00	0.98			1.00
Flpb, ped/bikes		1.00	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			0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)		3200	1583	1687	3200			1770	1546			1583
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (perm)		3200	1583	1687	3200			1770	1546			1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.96	0.96	0.96	0.77	0.77	0.77	0.25	0.25	0.25
Adj. Flow (vph)	0	1161	41	62	1249	1	136	0	165	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1161	41	62	1250	0	0	136	165	0	0	4
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)		80.8	80.8	8.5	93.0			18.1	18.1			5.5
Effective Green, g (s)		82.8	82.8	8.2	95.0			17.8	17.8			5.2
Actuated g/C Ratio		0.64	0.64	0.06	0.73			0.14	0.14			0.04
Clearance Time (s)		6.0	6.0	3.7	6.0			3.7	3.7			3.7
Vehicle Extension (s)		3.0	3.0	2.5	3.0			2.5	2.5			2.5
Lane Grp Cap (vph)		2038	1008	106	2338			242	212			63
v/s Ratio Prot		c0.36		0.04	c0.39			0.08				
v/s Ratio Perm			0.03						c0.11			c0.00
v/c Ratio		0.57	0.04	0.58	0.53			0.56	0.78			0.06
Uniform Delay, d1		13.4	8.8	59.2	7.7			52.5	54.2			60.1
Progression Factor		1.69	1.61	1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2		1.0	0.1	6.7	0.9			2.4	15.8			0.3
Delay (s)		23.7	14.2	65.9	8.6			54.9	69.9			60.4
Level of Service		C	B	E	A			D	E			E
Approach Delay (s)		23.4			11.3			63.1			60.4	
Approach LOS		C			B			E			E	

Intersection Summary

HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	17	1074	901	6	1	359
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	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
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	1600	3200	1548	1770	1579
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1600	3200	1548	1770	1579
Peak-hour factor, PHF	0.88	0.88	0.91	0.91	0.70	0.70
Adj. Flow (vph)	19	1220	990	7	1	513
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	19	1220	990	7	1	513
Confl. Peds. (#/hr)	1			1	1	1
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Actuated Green, G (s)	21.7	66.0	40.3	40.3	5.6	27.3
Effective Green, g (s)	21.7	66.0	40.3	40.3	5.6	27.3
Actuated g/C Ratio	0.27	0.83	0.51	0.51	0.07	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	483	1327	1620	784	125	621
v/s Ratio Prot	0.01	c0.76	0.31		0.00	c0.23
v/s Ratio Perm				0.00		0.10
v/c Ratio	0.04	0.92	0.61	0.01	0.01	0.83
Uniform Delay, d1	21.3	4.9	14.0	9.7	34.4	24.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	10.3	0.7	0.0	0.0	8.8
Delay (s)	21.3	15.2	14.7	9.8	34.4	32.8
Level of Service	C	B	B	A	C	C
Approach Delay (s)		15.3	14.7		32.8	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.9%	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)	203	534	228	433	398	88	271	858	615	111	455	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	2.4	4.0	4.0	3.7	4.0	4.0	2.7	4.0	4.0	3.7
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	4990	3539	1568	3433	3539	1583	1770	3539	1567
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	4990	3539	1568	3433	3539	1583	1770	3539	1567
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)	221	580	248	471	433	96	295	933	668	121	495	151
RTOR Reduction (vph)	0	0	60	0	0	30	0	0	0	0	0	69
Lane Group Flow (vph)	221	580	188	471	433	66	295	933	668	121	495	82
Confl. Peds. (#/hr)	2					2				2		2
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		Free	Prot		pm+ov
Protected Phases	7	4	5	3	8	1	5	2		1	6	7
Permitted Phases			4			8			Free			6
Actuated Green, G (s)	11.0	21.4	33.6	13.3	23.7	33.5	12.2	34.5	97.0	9.8	32.1	43.1
Effective Green, g (s)	10.7	22.7	36.2	13.0	25.0	33.5	11.9	35.8	97.0	9.5	33.4	43.1
Actuated g/C Ratio	0.11	0.23	0.37	0.13	0.26	0.35	0.12	0.37	1.00	0.10	0.34	0.44
Clearance Time (s)	3.7	5.3	3.7	3.7	5.3	3.7	3.7	5.3		3.7	5.3	3.7
Vehicle Extension (s)	3.0	3.5	3.0	3.0	3.5	3.0	3.0	4.0		3.0	4.0	3.0
Lane Grp Cap (vph)	379	828	591	669	912	542	421	1306	1583	173	1219	696
v/s Ratio Prot	0.06	c0.16	0.04	c0.09	0.12	0.01	c0.09	c0.26		0.07	0.14	0.01
v/s Ratio Perm			0.07			0.03			c0.42			0.04
v/c Ratio	0.58	0.70	0.32	0.70	0.47	0.12	0.70	0.71	0.42	0.70	0.41	0.12
Uniform Delay, d1	41.0	34.0	21.6	40.2	30.4	21.7	40.8	26.2	0.0	42.4	24.2	15.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	2.8	0.3	3.4	0.5	0.1	5.2	3.4	0.8	11.7	1.0	0.1
Delay (s)	43.3	36.8	21.9	43.5	30.9	21.8	46.0	29.6	0.8	54.0	25.2	15.9
Level of Service	D	D	C	D	C	C	D	C	A	D	C	B
Approach Delay (s)		34.7			36.0			22.0			27.9	
Approach LOS		C			D			C			C	

Intersection Summary

HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.9%	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)	68	208	0	0	267	151	1	5	7	157	1	130
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
Frt	1.00	1.00			0.95			0.93			1.00	0.85
Flt Protected	0.95	1.00			1.00			1.00			0.95	1.00
Satd. Flow (prot)	1752	1845			1745			1723			1757	1583
Flt Permitted	0.95	1.00			1.00			1.00			0.95	1.00
Satd. Flow (perm)	1752	1845			1745			1723			1757	1583
Peak-hour factor, PHF	0.69	0.69	0.69	0.93	0.93	0.93	0.65	0.65	0.65	0.78	0.78	0.78
Adj. Flow (vph)	99	301	0	0	287	162	2	8	11	201	1	167
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	99	301	0	0	449	0	0	21	0	0	202	167
Heavy Vehicles (%)	3%	3%	2%	2%	3%	3%	2%	2%	2%	3%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												6
Actuated Green, G (s)	5.0	28.9			19.9			6.3			11.8	11.8
Effective Green, g (s)	5.0	28.9			19.9			6.3			11.8	11.8
Actuated g/C Ratio	0.08	0.49			0.34			0.11			0.20	0.20
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	148	904			589			184			351	317
v/s Ratio Prot	c0.06	0.16			c0.26			c0.01			c0.11	
v/s Ratio Perm												0.11
v/c Ratio	0.67	0.33			0.76			0.11			0.58	0.53
Uniform Delay, d1	26.2	9.2			17.4			23.8			21.3	21.1
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	10.9	0.2			5.8			0.3			2.3	1.6
Delay (s)	37.1	9.4			23.2			24.1			23.6	22.7
Level of Service	D	A			C			C			C	C
Approach Delay (s)		16.2			23.2			24.1			23.2	
Approach LOS		B			C			C			C	

Intersection Summary

HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
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)	398	464	19	34	563	228	25	223	56	188	259	728
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	6.5	4.0	4.0	1.5	4.0	4.0	6.5	4.0	4.0	2.5
Lane Util. Factor	0.94	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	0.88
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	3539	1549	1770	3539	1570	1770	3539	1561	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	3539	1549	1770	3539	1570	1770	3539	1561	3433	1863	2787
Peak-hour factor, PHF	0.77	0.77	0.77	0.91	0.91	0.91	0.85	0.85	0.85	0.91	0.91	0.91
Adj. Flow (vph)	517	603	25	37	619	251	29	262	66	207	285	800
RTOR Reduction (vph)	0	0	0	0	0	130	0	0	0	0	0	205
Lane Group Flow (vph)	517	603	25	37	619	121	29	262	66	207	285	595
Confl. Peds. (#/hr)			1	2		1	1		2	1		
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6	7	3	8		7	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	7.2	24.9	24.9	2.2	19.4	28.7	2.0	11.6	11.6	9.3	19.4	26.6
Effective Green, g (s)	7.7	27.4	24.9	1.7	21.4	32.7	1.5	14.1	11.6	8.8	21.4	30.6
Actuated g/C Ratio	0.11	0.40	0.37	0.02	0.31	0.48	0.02	0.21	0.17	0.13	0.31	0.45
Clearance Time (s)	4.5	6.5	6.5	3.5	6.0	3.5	3.5	6.5	6.5	3.5	6.0	4.5
Vehicle Extension (s)	1.0	4.5	4.5	1.0	4.5	1.0	1.0	4.5	4.5	1.0	4.5	1.0
Lane Grp Cap (vph)	565	1426	567	44	1114	755	39	734	266	444	586	1254
v/s Ratio Prot	c0.10	0.17		0.02	c0.17	0.03	c0.02	0.07		0.06	c0.15	0.06
v/s Ratio Perm			0.02			0.05			0.04			0.15
v/c Ratio	0.92	0.42	0.04	0.84	0.56	0.16	0.74	0.36	0.25	0.47	0.49	0.47
Uniform Delay, d1	29.8	14.6	13.9	33.0	19.4	9.9	33.1	23.1	24.4	27.4	18.9	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.2	0.9	0.1	75.1	2.0	0.0	48.9	0.5	0.8	0.3	1.1	0.1
Delay (s)	49.0	15.5	14.0	108.1	21.4	10.0	81.9	23.6	25.3	27.7	20.0	13.2
Level of Service	D	B	B	F	C	A	F	C	C	C	B	B
Approach Delay (s)		30.6			21.7			28.6			17.0	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	587	48	43	1278	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	0.81	0.81	0.91	0.91	0.84	0.84
Adj. Flow (vph)	725	59	47	1404	85	99
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	725	59	47	1404	85	99
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	95.0	95.0	6.9	105.6	11.7	11.7
Effective Green, g (s)	97.0	97.0	6.6	107.6	11.9	11.9
Actuated g/C Ratio	0.76	0.76	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)	1217	1204	92	1350	165	148
v/s Ratio Prot	0.45		0.03	c0.88	0.05	
v/s Ratio Perm		0.04				c0.06
v/c Ratio	0.60	0.05	0.51	1.04	0.52	0.67
Uniform Delay, d1	6.7	3.8	58.9	10.0	55.1	55.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	4.7	35.6	1.1	8.6
Delay (s)	7.2	3.8	63.6	45.5	56.2	64.4
Level of Service	A	A	E	D	E	E
Approach Delay (s)	6.9			46.1	60.6	
Approach LOS	A			D	E	

Intersection Summary

HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	127.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.9%	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)	85	569	16	46	1072	168	30	33	134	248	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	0.95	1.00	1.00	0.95	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	3200	1583	1770	3200	1583		1679			1786	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.92			0.57	1.00
Satd. Flow (perm)	1770	3200	1583	1770	3200	1583		1549			1053	1583
Peak-hour factor, PHF	0.77	0.77	0.77	0.97	0.97	0.97	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	110	739	21	47	1105	173	34	38	152	299	51	264
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	110	739	21	47	1105	173	0	224	0	0	350	264
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)	5.7	32.9	32.9	3.9	31.1	31.1		27.3			27.3	27.3
Effective Green, g (s)	5.2	34.9	34.9	3.4	33.1	33.1		27.3			27.3	27.3
Actuated g/C Ratio	0.07	0.45	0.45	0.04	0.43	0.43		0.35			0.35	0.35
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)	119	1439	712	78	1365	675		545			370	557
v/s Ratio Prot	c0.06	0.23		0.03	c0.35							
v/s Ratio Perm			0.01			0.11		0.14			c0.33	0.17
v/c Ratio	0.92	0.51	0.03	0.60	0.81	0.26		0.41			0.95	0.47
Uniform Delay, d1	36.0	15.3	11.9	36.4	19.5	14.3		19.1			24.4	19.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	59.0	1.3	0.1	12.4	5.3	0.9		0.5			32.8	0.6
Delay (s)	95.0	16.6	12.0	48.9	24.8	15.2		19.6			57.2	20.2
Level of Service	F	B	B	D	C	B		B			E	C
Approach Delay (s)		26.4			24.4			19.6			41.3	
Approach LOS		C			C			B			D	

Intersection Summary

HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	79	840	1122	83	293	149
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	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1600	3200	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1600	3200	1583	1770	1583
Peak-hour factor, PHF	0.88	0.88	0.86	0.86	0.90	0.90
Adj. Flow (vph)	90	955	1305	97	326	166
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	90	955	1305	97	326	166
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	6.0	63.2	53.0	53.0	22.6	22.6
Effective Green, g (s)	6.2	65.2	55.0	55.0	22.8	22.8
Actuated g/C Ratio	0.06	0.68	0.57	0.57	0.24	0.24
Clearance Time (s)	4.2	6.0	6.0	6.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	4.5	3.5	3.5
Lane Grp Cap (vph)	114	1087	1833	907	420	376
v/s Ratio Prot	0.05	c0.60	0.41		c0.18	
v/s Ratio Perm				0.06		0.10
v/c Ratio	0.79	0.88	0.71	0.11	0.78	0.44
Uniform Delay, d1	44.3	12.3	14.8	9.3	34.2	31.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.3	8.7	1.5	0.1	9.0	1.0
Delay (s)	76.6	21.0	16.3	9.4	43.2	32.2
Level of Service	E	C	B	A	D	C
Approach Delay (s)		25.8	15.8		39.5	
Approach LOS		C	B		D	

Intersection Summary

HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	96.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.1%	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)	43	1026	64	13	1071	18	70	5	30	34	4	64
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	0.95	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	3200	1583	1770	1625			1783	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	3200	1583	1334	1625			1345	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.75	0.75	0.75	0.61	0.61	0.61
Adj. Flow (vph)	46	1103	69	14	1177	20	93	7	40	56	7	105
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	46	1103	69	14	1177	20	93	47	0	0	63	105
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)	5.4	84.5	84.5	1.2	80.3	80.3	14.8	14.8			14.8	14.8
Effective Green, g (s)	5.1	86.5	86.5	0.9	82.3	82.3	14.9	14.9			14.9	14.9
Actuated g/C Ratio	0.04	0.76	0.76	0.01	0.72	0.72	0.13	0.13			0.13	0.13
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)	79	1211	1198	14	2304	1140	174	212			175	206
v/s Ratio Prot	c0.03	c0.69		0.01	0.37			0.03				
v/s Ratio Perm			0.04			0.01	c0.07				0.05	0.07
v/c Ratio	0.58	0.91	0.06	1.00	0.51	0.02	0.53	0.22			0.36	0.51
Uniform Delay, d1	53.6	10.9	3.5	56.7	7.1	4.5	46.5	44.5			45.3	46.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	10.5	10.5	0.0	240.5	0.3	0.0	3.1	0.5			1.3	2.0
Delay (s)	64.0	21.4	3.6	297.2	7.3	4.5	49.6	45.0			46.6	48.3
Level of Service	E	C	A	F	A	A	D	D			D	D
Approach Delay (s)		22.0			10.6			48.1			47.7	
Approach LOS		C			B			D			D	

Intersection Summary

HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	114.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	950	140	189	885	217	359
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	0.95	1.00	1.00	0.95	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)	3200	1583	1770	3200	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	1770	3200	1770	1583
Peak-hour factor, PHF	0.97	0.97	0.89	0.89	0.74	0.74
Adj. Flow (vph)	979	144	212	994	293	485
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	979	144	212	994	293	485
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)	37.5	37.5	15.4	56.6	38.5	38.5
Effective Green, g (s)	39.5	39.5	15.1	58.6	38.2	38.2
Actuated g/C Ratio	0.38	0.38	0.14	0.56	0.36	0.36
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)	1206	597	255	1789	645	577
v/s Ratio Prot	c0.31		c0.12	0.31	0.17	
v/s Ratio Perm		0.09				c0.31
v/c Ratio	0.81	0.24	0.83	0.56	0.45	0.84
Uniform Delay, d1	29.3	22.4	43.6	14.8	25.4	30.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.2	19.7	0.3	0.5	10.7
Delay (s)	33.5	22.5	63.3	15.1	25.9	41.2
Level of Service	C	C	E	B	C	D
Approach Delay (s)	32.1			23.6	35.4	
Approach LOS	C			C	D	

Intersection Summary

HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	104.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1193	116	153	996	78	158
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	0.95	1.00	1.00	0.95	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)	3200	1583	1770	3200	1770	1568
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	1770	3200	1770	1568
Peak-hour factor, PHF	0.94	0.94	0.88	0.88	0.79	0.79
Adj. Flow (vph)	1269	123	174	1132	99	200
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1269	123	174	1132	99	200
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	84.3	103.6	13.0	101.0	19.3	19.3
Effective Green, g (s)	86.3	103.0	12.7	103.0	19.0	19.0
Actuated g/C Ratio	0.66	0.79	0.10	0.79	0.15	0.15
Clearance Time (s)	6.0	3.7	3.7	6.0	3.7	3.7
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5
Lane Grp Cap (vph)	2124	1254	173	2535	259	229
v/s Ratio Prot	c0.40	0.01	c0.10	0.35	0.06	
v/s Ratio Perm		0.06				c0.13
v/c Ratio	0.60	0.10	1.01	0.45	0.38	0.87
Uniform Delay, d1	12.2	3.0	58.6	4.3	50.2	54.3
Progression Factor	1.00	1.00	1.23	0.54	1.00	1.00
Incremental Delay, d2	1.2	0.0	66.5	0.5	0.7	28.4
Delay (s)	13.4	3.1	138.7	2.8	50.9	82.7
Level of Service	B	A	F	A	D	F
Approach Delay (s)	12.5			20.9	72.2	
Approach LOS	B			C	E	

Intersection Summary

HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	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)	2	1257	106	124	1079	1	68	2	88	0	0	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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00			1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85			0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1770	3200	1583	1736	3200			1777	1583			1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (perm)	1770	3200	1583	1736	3200			1777	1583			1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.76	0.76	0.76	0.50	0.50	0.50
Adj. Flow (vph)	2	1381	116	133	1160	1	89	3	116	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1381	116	133	1161	0	0	92	116	0	0	4
Heavy Vehicles (%)	2%	2%	2%	4%	2%	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	79.6	79.6	15.0	93.3			12.8	12.8			5.5
Effective Green, g (s)	1.0	81.6	81.6	14.7	95.3			12.5	12.5			5.2
Actuated g/C Ratio	0.01	0.63	0.63	0.11	0.73			0.10	0.10			0.04
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			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
Lane Grp Cap (vph)	14	2009	994	196	2346			171	152			63
v/s Ratio Prot	0.00	c0.43		c0.08	0.36			0.05				
v/s Ratio Perm			0.07						c0.07			c0.00
v/c Ratio	0.14	0.69	0.12	0.68	0.49			0.54	0.76			0.06
Uniform Delay, d1	64.1	15.8	9.7	55.4	7.3			56.0	57.3			60.1
Progression Factor	1.25	0.79	0.60	1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	3.7	1.5	0.2	8.2	0.7			2.5	19.3			0.3
Delay (s)	84.1	14.1	6.0	63.6	8.0			58.5	76.6			60.4
Level of Service	F	B	A	E	A			E	E			E
Approach Delay (s)		13.5			13.7			68.6			60.4	
Approach LOS		B			B			E			E	

Intersection Summary

HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	61	1284	1161	42	2	43
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	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1600	3200	1583	1770	1583
Flt Permitted	0.21	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	395	1600	3200	1583	1770	1583
Peak-hour factor, PHF	0.91	0.91	0.93	0.93	0.80	0.80
Adj. Flow (vph)	67	1411	1248	45	2	54
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	67	1411	1248	45	2	54
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	126.1	126.1	126.1	126.1	10.3	10.3
Effective Green, g (s)	126.1	126.1	126.1	126.1	10.3	10.3
Actuated g/C Ratio	0.87	0.87	0.87	0.87	0.07	0.07
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	345	1397	2794	1382	126	113
v/s Ratio Prot		c0.88	0.39		0.00	
v/s Ratio Perm	0.17			0.03		c0.03
v/c Ratio	0.19	1.01	0.45	0.03	0.02	0.48
Uniform Delay, d1	1.4	9.2	1.9	1.2	62.3	64.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	26.6	0.1	0.0	0.1	3.2
Delay (s)	1.7	35.7	2.0	1.2	62.4	67.6
Level of Service	A	D	A	A	E	E
Approach Delay (s)		34.2	2.0		67.4	
Approach LOS		C	A		E	

Intersection Summary

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	144.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	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)	333	346	282	624	478	129	251	635	428	135	814	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	2.4	4.0	4.0	3.7	4.0	4.0	2.7	4.0	4.0	3.7
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1570	4990	3539	1569	3433	3539	1563	1770	3539	1567
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1570	4990	3539	1569	3433	3539	1563	1770	3539	1567
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)	362	376	307	678	520	140	273	690	465	147	885	257
RTOR Reduction (vph)	0	0	8	0	0	29	0	0	0	0	0	46
Lane Group Flow (vph)	362	376	299	678	520	111	273	690	465	147	885	211
Confl. Peds. (#/hr)	4		3	2		3	3		2	3		3
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		Free	Prot		pm+ov
Protected Phases	7	4	5	3	8	1	5	2		1	6	7
Permitted Phases			4			8			Free			6
Actuated Green, G (s)	15.0	17.4	30.4	17.9	20.3	33.3	13.0	32.6	98.9	13.0	32.6	47.6
Effective Green, g (s)	14.7	18.7	33.0	17.6	21.6	33.3	12.7	33.9	98.9	12.7	33.9	47.6
Actuated g/C Ratio	0.15	0.19	0.33	0.18	0.22	0.34	0.13	0.34	1.00	0.13	0.34	0.48
Clearance Time (s)	3.7	5.3	3.7	3.7	5.3	3.7	3.7	5.3		3.7	5.3	3.7
Vehicle Extension (s)	3.0	3.5	3.0	3.0	3.5	3.0	3.0	4.0		3.0	4.0	3.0
Lane Grp Cap (vph)	510	669	524	888	773	528	441	1213	1563	227	1213	754
v/s Ratio Prot	0.11	0.11	0.08	c0.14	c0.15	0.03	0.08	0.19		c0.08	c0.25	0.04
v/s Ratio Perm			0.11			0.04			c0.30			0.09
v/c Ratio	0.71	0.56	0.57	0.76	0.67	0.21	0.62	0.57	0.30	0.65	0.73	0.28
Uniform Delay, d1	40.1	36.4	27.1	38.7	35.4	23.4	40.8	26.5	0.0	41.0	28.5	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	1.2	1.5	3.9	2.4	0.2	2.6	1.9	0.5	6.2	3.9	0.2
Delay (s)	44.6	37.6	28.6	42.6	37.8	23.6	43.4	28.5	0.5	47.2	32.4	15.6
Level of Service	D	D	C	D	D	C	D	C	A	D	C	B
Approach Delay (s)		37.4			38.8			22.2			30.7	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	98.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	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)	147	278	1	6	281	118	0	1	1	157	1	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.96			0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.95	1.00
Satd. Flow (prot)	1770	1862		1770	1760			1737			1757	1583
Flt Permitted	0.95	1.00		0.95	1.00			1.00			0.95	1.00
Satd. Flow (perm)	1770	1862		1770	1760			1737			1757	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.82	0.82	0.82	0.50	0.50	0.50	0.80	0.80	0.80
Adj. Flow (vph)	169	320	1	7	343	144	0	2	2	196	1	80
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	169	321	0	7	487	0	0	4	0	0	197	80
Heavy Vehicles (%)	2%	2%	2%	2%	2%	6%	2%	2%	2%	3%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												6
Actuated Green, G (s)	8.0	33.0		0.7	25.7			5.8			12.1	12.1
Effective Green, g (s)	8.0	33.0		0.7	25.7			5.8			12.1	12.1
Actuated g/C Ratio	0.12	0.49		0.01	0.38			0.09			0.18	0.18
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	209	909		18	669			149			314	283
v/s Ratio Prot	c0.10	0.17		0.00	c0.28			c0.00			c0.11	
v/s Ratio Perm												0.05
v/c Ratio	0.81	0.35		0.39	0.73			0.03			0.63	0.28
Uniform Delay, d1	29.1	10.7		33.2	18.0			28.3			25.7	24.0
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	20.1	0.2		13.4	4.0			0.1			3.9	0.6
Delay (s)	49.1	10.9		46.6	21.9			28.4			29.6	24.5
Level of Service	D	B		D	C			C			C	C
Approach Delay (s)		24.1			22.3			28.4			28.1	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.5%	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)	844	549	6	33	576	317	15	233	71	231	211	501
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	6.5	4.0	4.0	1.5	4.0	4.0	6.5	4.0	4.0	2.5
Lane Util. Factor	0.94	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	3539	1583	1770	3539	1583	1770	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	3539	1583	1770	3539	1583	1770	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.94	0.94	0.94	0.82	0.82	0.82	0.77	0.77	0.77	0.83	0.83	0.83
Adj. Flow (vph)	898	584	6	40	702	387	19	303	92	278	254	604
RTOR Reduction (vph)	0	0	0	0	0	92	0	0	0	0	0	110
Lane Group Flow (vph)	898	584	6	40	702	295	19	303	92	278	254	494
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6	7	3	8		7	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	14.5	30.2	30.2	3.4	18.6	29.4	0.8	13.2	13.2	10.8	23.7	38.2
Effective Green, g (s)	15.0	32.7	30.2	2.9	20.6	33.4	0.3	15.7	13.2	10.3	25.7	42.2
Actuated g/C Ratio	0.19	0.42	0.39	0.04	0.27	0.43	0.00	0.20	0.17	0.13	0.33	0.54
Clearance Time (s)	4.5	6.5	6.5	3.5	6.0	3.5	3.5	6.5	6.5	3.5	6.0	4.5
Vehicle Extension (s)	1.0	4.5	4.5	1.0	4.5	1.0	1.0	4.5	4.5	1.0	4.5	1.0
Lane Grp Cap (vph)	965	1491	616	66	939	681	7	716	269	456	617	1516
v/s Ratio Prot	c0.18	0.17		0.02	c0.20	0.07	c0.01	c0.09		c0.08	0.14	0.07
v/s Ratio Perm			0.00			0.12			0.06			0.11
v/c Ratio	0.93	0.39	0.01	0.61	0.75	0.43	2.71	0.42	0.34	0.61	0.41	0.33
Uniform Delay, d1	30.8	15.6	14.5	36.8	26.1	15.5	38.6	27.0	28.4	31.8	20.1	9.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.8	0.8	0.0	10.3	5.4	0.2	1066.1	0.7	1.3	1.6	0.8	0.0
Delay (s)	45.6	16.3	14.6	47.1	31.5	15.6	1104.7	27.7	29.7	33.3	20.9	9.9
Level of Service	D	B	B	D	C	B	F	C	C	C	C	A
Approach Delay (s)		34.0			26.6			77.6			18.1	
Approach LOS		C			C			E			B	

Intersection Summary

HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 1/15/2007
Analysis Period: Existing AM-Mitigated
Highway: 68
From/To: San Benancio Rd. / Torero Dr.
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Eastbound Direction 2 = Westbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	60.0	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1091	vph	1260	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	303		350	
Trucks and buses	4	%	4	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.980		0.980	
Flow rate, vp	618	pcphpl	714	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	618	pcphpl	714	pcphpl
Free-flow speed, FFS	60.0	mph	60.0	mph
Avg. passenger-car travel speed, S	60.0	mph	60.0	mph
Level of service, LOS	A		B	
Density, D	10.3	pc/mi/ln	11.9	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 1/15/2007
Analysis Period: Existing AM-Mitigated
Highway: 68
From/To: Torero Dr. / Begin-End Freeway
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Eastbound Direction 2 = Westbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	60.0	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1075	vph	907	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	299		252	
Trucks and buses	4	%	4	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.980		0.980	
Flow rate, vp	609	pcphpl	513	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	609	pcphpl	513	pcphpl
Free-flow speed, FFS	60.0	mph	60.0	mph
Avg. passenger-car travel speed, S	60.0	mph	60.0	mph
Level of service, LOS	A		A	
Density, D	10.1	pc/mi/ln	8.6	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 2/2/2007
Analysis Period: Existing AM-Mitigated
Highway: 218
From/To: Highway 68 / General Jim Moore
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Northbound Direction 2 = Southbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	45.0	mph	45.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	45.0	mph	45.0	mph

VOLUME

Direction	1		2	
Volume, V	514	vph	660	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	143		183	
Trucks and buses	2	%	2	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.990		0.990	
Flow rate, vp	288	pcphpl	370	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	288	pcphpl	370	pcphpl
Free-flow speed, FFS	45.0	mph	45.0	mph
Avg. passenger-car travel speed, S	45.0	mph	45.0	mph
Level of service, LOS	A		A	
Density, D	6.4	pc/mi/ln	8.2	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 2/7/2007
Analysis Period: Existing AM-Mitigated
Highway: Reservation Road
From/To: Davis Road / Highway 68
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Eastbound Direction 2 = Westbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	7		7	
Median type	Undivided		Undivided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	1.6	mph	1.6	mph
Access points adjustment, FA	1.8	mph	1.8	mph
Free-flow speed	56.7	mph	56.7	mph

VOLUME

Direction	1		2	
Volume, V	444	vph	410	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	121		111	
Trucks and buses	6	%	6	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.971		0.971	
Flow rate, vp	248	pcphpl	229	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	248	pcphpl	229	pcphpl
Free-flow speed, FFS	56.7	mph	56.7	mph
Avg. passenger-car travel speed, S	56.7	mph	56.7	mph
Level of service, LOS	A		A	
Density, D	4.4	pc/mi/ln	4.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 2/7/2007
Analysis Period: Existing AM-Mitigated
Highway: Davis Road
From/To: Reservation Road / Blanco Road
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Northbound Direction 2 = Southbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	3		3	
Median type	Undivided		Undivided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	1.6	mph	1.6	mph
Access points adjustment, FA	0.8	mph	0.8	mph
Free-flow speed	57.7	mph	57.7	mph

VOLUME

Direction	1		2	
Volume, V	323	vph	419	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	88		114	
Trucks and buses	3	%	3	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.985		0.985	
Flow rate, vp	178	pcphpl	231	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	178	pcphpl	231	pcphpl
Free-flow speed, FFS	57.7	mph	57.7	mph
Avg. passenger-car travel speed, S	57.7	mph	57.7	mph
Level of service, LOS	A		A	
Density, D	3.1	pc/mi/ln	4.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 1/15/2007
Analysis Period: Existing PM-Mitigated
Highway: 68
From/To: San Benancio Rd. / Torero Dr.
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Eastbound Direction 2 = Westbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	60.0	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1345	vph	1204	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	374		334	
Trucks and buses	4	%	4	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.980		0.980	
Flow rate, vp	762	pcphpl	682	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	762	pcphpl	682	pcphpl
Free-flow speed, FFS	60.0	mph	60.0	mph
Avg. passenger-car travel speed, S	60.0	mph	60.0	mph
Level of service, LOS	B		B	
Density, D	12.7	pc/mi/ln	11.4	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 1/15/2007
Analysis Period: Existing PM-Mitigated
Highway: 68
From/To: Torero Dr. / Begin-End Freeway
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Eastbound Direction 2 = Westbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	60.0	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1286	vph	1203	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	357		334	
Trucks and buses	4	%	4	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.980		0.980	
Flow rate, vp	728	pcphpl	681	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	728	pcphpl	681	pcphpl
Free-flow speed, FFS	60.0	mph	60.0	mph
Avg. passenger-car travel speed, S	60.0	mph	60.0	mph
Level of service, LOS	B		B	
Density, D	12.1	pc/mi/ln	11.4	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 2/2/2007
Analysis Period: Existing PM-Mitigated
Highway: 218
From/To: Highway 68 / General Jim Moore
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Northbound Direction 2 = Southbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	45.0	mph	45.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	45.0	mph	45.0	mph

VOLUME

Direction	1		2	
Volume, V	772	vph	405	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	214		113	
Trucks and buses	2	%	2	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.990		0.990	
Flow rate, vp	433	pcphpl	227	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	433	pcphpl	227	pcphpl
Free-flow speed, FFS	45.0	mph	45.0	mph
Avg. passenger-car travel speed, S	45.0	mph	45.0	mph
Level of service, LOS	A		A	
Density, D	9.6	pc/mi/ln	5.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	JHO
Agency/Co:	Higgins Associates
Date:	2/7/2007
Analysis Period:	Existing PM-Mitigated
Highway:	Reservation Road
From/To:	Davis Road / Highway 68
Jurisdiction:	6-151
Analysis Year:	
Project ID:	Direction 1 = Eastbound Direction 2 = Westbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	7		7	
Median type	Undivided		Undivided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	1.6	mph	1.6	mph
Access points adjustment, FA	1.8	mph	1.8	mph
Free-flow speed	56.7	mph	56.7	mph

VOLUME

Direction	1		2	
Volume, V	436	vph	405	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	118		110	
Trucks and buses	6	%	6	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.971		0.971	
Flow rate, vp	244	pcphpl	226	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	244	pcphpl	226	pcphpl
Free-flow speed, FFS	56.7	mph	56.7	mph
Avg. passenger-car travel speed, S	56.7	mph	56.7	mph
Level of service, LOS	A		A	
Density, D	4.3	pc/mi/ln	4.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.2

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: JHO
Agency/Co: Higgins Associates
Date: 2/7/2007
Analysis Period: Existing PM-Mitigated
Highway: Davis Road
From/To: Reservation Road / Blanco Road
Jurisdiction: 6-151
Analysis Year:
Project ID: Direction 1 = Northbound Direction 2 = Southbound

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	3		3	
Median type	Undivided		Undivided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	1.6	mph	1.6	mph
Access points adjustment, FA	0.8	mph	0.8	mph
Free-flow speed	57.7	mph	57.7	mph

VOLUME

Direction	1		2	
Volume, V	237	vph	300	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	64		82	
Trucks and buses	3	%	3	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.985		0.985	
Flow rate, vp	130	pcphpl	165	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	130	pcphpl	165	pcphpl
Free-flow speed, FFS	57.7	mph	57.7	mph
Avg. passenger-car travel speed, S	57.7	mph	57.7	mph
Level of service, LOS	A		A	
Density, D	2.3	pc/mi/ln	2.9	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.