Existing Plus Project with Mitigations Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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		0.91		1.00	0.91					0.95	0.91	0.95
Frt		0.98		1.00	1.00					1.00	0.95	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.97	1.00
Satd. Flow (prot)		4984		1770	5085					1681	1564	1504
Flt Permitted		1.00		0.95	1.00					0.95	0.97	1.00
Satd. Flow (perm)		4984		1770	5085					1681	1564	1504
Volume (vph)	0	1752	268	388	932	0	0	0	0	396	0	399
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	1904	291	422	1013	0	0	0	0	430	0	434
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	13	153
Lane Group Flow (vph)	0	2178	0	422	1013	0	0	0	0	248	248	202
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		57.2		29.7	90.9					21.1	21.1	21.1
Effective Green, g (s)		57.2		29.7	90.9					21.1	21.1	21.1
Actuated g/C Ratio		0.48		0.25	0.76					0.18	0.18	0.18
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)		2376		438	3852					296	275	264
v/s Ratio Prot		c0.44		c0.24	0.20					0.15	c0.16	
v/s Ratio Perm												0.13
v/c Ratio		0.92		0.96	0.26					0.84	0.90	0.76
Uniform Delay, d1		29.2		44.6	4.4					47.8	48.4	47.1
Progression Factor		1.00		0.26	0.57					1.00	1.00	1.00
Incremental Delay, d2		7.0		15.4	0.1					18.3	30.0	12.3
Delay (s)		36.2		27.2	2.6					66.1	78.4	59.4
Level of Service		D		C	A					E	E	E
Approach Delay (s)		36.2			9.8			0.0			67.1	
Approach LOS		D			A			A			E	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
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												
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	0.91			0.91		0.95	0.91	0.95			
Frt	1.00	1.00			0.95		1.00	0.90	0.85			
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00			
Satd. Flow (prot)	1770	5085			4847		1681	1505	1504			
Flt Permitted	0.95	1.00			1.00		0.95	0.98	1.00			
Satd. Flow (perm)	1770	5085			4847		1681	1505	1504			
Volume (vph)	690	1458	0	0	1135	514	185	0	259	0	0	0
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)	750	1585	0	0	1234	559	201	0	282	0	0	0
RTOR Reduction (vph)	0	0	0	0	66	0	0	54	69	0	0	0
Lane Group Flow (vph)	750	1585	0	0	1727	0	139	118	103	0	0	0
Turn Type	Prot						Split		Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases									8			
Actuated Green, G (s)	50.0	98.2			44.2		13.8	13.8	13.8			
Effective Green, g (s)	50.0	98.2			44.2		13.8	13.8	13.8			
Actuated g/C Ratio	0.42	0.82			0.37		0.12	0.12	0.12			
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)	738	4161			1785		193	173	173			
v/s Ratio Prot	c0.42	0.31			c0.36		c0.08	0.08				
v/s Ratio Perm									0.07			
v/c Ratio	1.02	0.38			0.97		0.72	0.68	0.60			
Uniform Delay, d1	35.0	2.9			37.2		51.2	51.0	50.4			
Progression Factor	0.14	0.15			1.00		1.00	1.00	1.00			
Incremental Delay, d2	24.7	0.1			14.9		12.4	10.6	5.4			
Delay (s)	29.7	0.5			52.0		63.6	61.6	55.9			
Level of Service	C	A			D		E	E	E			
Approach Delay (s)		9.9			52.0			60.1			0.0	
Approach LOS		A			D			E			A	

Intersection Summary			
HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
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												
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		0.91	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)		5085	1583	1770	3539					1770		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5085	1583	1770	3539					1770		1583
Volume (vph)	0	932	480	194	746	0	0	0	0	146	0	424
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	1013	522	211	811	0	0	0	0	159	0	461
RTOR Reduction (vph)	0	0	323	0	0	0	0	0	0	0	0	141
Lane Group Flow (vph)	0	1013	199	211	811	0	0	0	0	159	0	320
Turn Type			Perm	Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases			2							4		4
Actuated Green, G (s)		24.8	24.8	12.6	41.4					15.6		15.6
Effective Green, g (s)		24.8	24.8	12.6	41.4					15.6		15.6
Actuated g/C Ratio		0.38	0.38	0.19	0.64					0.24		0.24
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)		1940	604	343	2254					425		380
v/s Ratio Prot		c0.20		c0.12	0.23							
v/s Ratio Perm			0.13							0.09		c0.20
v/c Ratio		0.52	0.33	0.62	0.36					0.37		0.84
Uniform Delay, d1		15.5	14.2	24.0	5.6					20.6		23.5
Progression Factor		1.00	1.00	0.18	0.24					1.00		1.00
Incremental Delay, d2		1.0	1.5	2.4	0.3					0.6		15.5
Delay (s)		16.5	15.7	6.8	1.6					21.2		39.1
Level of Service		B	B	A	A					C		D
Approach Delay (s)		16.2			2.7			0.0			34.5	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	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												
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	0.95			0.95	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			3539	1583	1770		1583			
Volume (vph)	473	605	0	0	580	144	360	0	195	0	0	0
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)	514	658	0	0	630	157	391	0	212	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	116	0	0	160	0	0	0
Lane Group Flow (vph)	514	658	0	0	630	41	391	0	52	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	5	2			6							
Permitted Phases						6	8		8			
Actuated Green, G (s)	20.3	41.2			16.9	16.9	15.8		15.8			
Effective Green, g (s)	20.3	41.2			16.9	16.9	15.8		15.8			
Actuated g/C Ratio	0.31	0.63			0.26	0.26	0.24		0.24			
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)	553	2243			920	412	430		385			
v/s Ratio Prot	c0.29	0.19			c0.18							
v/s Ratio Perm						0.03	c0.22		0.03			
v/c Ratio	0.93	0.29			0.68	0.10	0.91		0.13			
Uniform Delay, d1	21.7	5.4			21.7	18.3	23.9		19.2			
Progression Factor	0.31	0.14			1.00	1.00	1.00		1.00			
Incremental Delay, d2	20.1	0.3			4.1	0.5	22.7		0.2			
Delay (s)	26.7	1.1			25.8	18.7	46.6		19.4			
Level of Service	C	A			C	B	D		B			
Approach Delay (s)		12.3			24.4			37.0			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
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	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1803		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1803		1770	1583
Volume (vph)	274	159	161	51	57	200
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	298	173	175	55	62	217
RTOR Reduction (vph)	0	0	22	0	0	162
Lane Group Flow (vph)	298	173	208	0	62	55
Confl. Peds. (#/hr)					100	
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	11.3	24.0	8.7		10.9	10.9
Effective Green, g (s)	11.3	24.0	8.7		10.9	10.9
Actuated g/C Ratio	0.26	0.56	0.20		0.25	0.25
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	466	1042	366		450	402
v/s Ratio Prot	c0.17	0.09	c0.12		c0.04	
v/s Ratio Perm						0.03
v/c Ratio	0.64	0.17	0.57		0.14	0.14
Uniform Delay, d1	14.0	4.6	15.4		12.4	12.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.9	0.1	2.0		0.1	0.2
Delay (s)	16.9	4.7	17.4		12.5	12.5
Level of Service	B	A	B		B	B
Approach Delay (s)		12.4	17.4		12.5	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	42.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	8	15	16	177	184	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	16	17	192	200	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	435	208	215			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	435	208	215			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	99			
cM capacity (veh/h)	571	833	1355			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	25	210	215
Volume Left	9	17	0
Volume Right	16	0	15
cSH	718	1355	1700
Volume to Capacity	0.03	0.01	0.13
Queue Length 95th (ft)	3	1	0
Control Delay (s)	10.2	0.7	0.0
Lane LOS	B	A	
Approach Delay (s)	10.2	0.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	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	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)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.75	1.00	1.00	0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1397	1863	1583	1369	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	123	31	131	13	11	16	75	175	16	49	384	118
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)	134	34	142	14	12	17	82	190	17	53	417	128
RTOR Reduction (vph)	0	0	113	0	0	14	0	0	8	0	0	62
Lane Group Flow (vph)	134	34	29	14	12	3	82	190	9	53	417	66
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	10.8	10.8	10.8	10.8	10.8	10.8	2.8	27.8	27.8	2.2	27.2	27.2
Effective Green, g (s)	10.8	10.8	10.8	10.8	10.8	10.8	2.8	27.8	27.8	2.2	27.2	27.2
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.05	0.53	0.53	0.04	0.52	0.52
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	381	324	280	381	324	94	981	833	74	960	815
v/s Ratio Prot		0.02			0.01		c0.05	0.10		0.03	c0.22	
v/s Ratio Perm	c0.10		0.02	0.01		0.00			0.01			0.04
v/c Ratio	0.47	0.09	0.09	0.05	0.03	0.01	0.87	0.19	0.01	0.72	0.43	0.08
Uniform Delay, d1	18.5	17.0	17.0	16.9	16.8	16.7	24.8	6.6	6.0	25.0	8.0	6.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1	0.1	0.1	0.0	0.0	53.6	0.1	0.0	27.9	0.3	0.0
Delay (s)	19.7	17.1	17.1	17.0	16.8	16.8	78.4	6.7	6.0	52.9	8.3	6.5
Level of Service	B	B	B	B	B	B	E	A	A	D	A	A
Approach Delay (s)		18.2			16.8			27.0			11.9	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1863	1583	1770	1863	1769	
Flt Permitted	1.00	1.00	0.51	1.00	0.95	
Satd. Flow (perm)	1863	1583	949	1863	1769	
Volume (vph)	359	161	8	262	120	4
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	390	175	9	285	130	4
RTOR Reduction (vph)	0	63	0	0	3	0
Lane Group Flow (vph)	390	112	9	285	131	0
Turn Type		Perm	Perm			
Protected Phases	4			8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	34.8	34.8	34.8	34.8	11.6	
Effective Green, g (s)	34.8	34.8	34.8	34.8	11.6	
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.21	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1192	1013	607	1192	377	
v/s Ratio Prot	c0.21			0.15	c0.07	
v/s Ratio Perm		0.07	0.01			
v/c Ratio	0.33	0.11	0.01	0.24	0.35	
Uniform Delay, d1	4.5	3.8	3.6	4.2	18.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.0	0.0	0.1	0.6	
Delay (s)	4.6	3.8	3.6	4.3	18.7	
Level of Service	A	A	A	A	B	
Approach Delay (s)	4.4			4.3	18.7	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	32.5%	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												
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		0.99			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	1845	1615	1805	1845	1583		1349			1780	1583
Flt Permitted	0.95	1.00	1.00	0.57	1.00	1.00		0.92			0.74	1.00
Satd. Flow (perm)	1770	1845	1615	1092	1845	1583		1263			1377	1583
Volume (vph)	107	280	10	4	301	73	15	22	4	108	8	92
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)	116	304	11	4	327	79	16	24	4	117	9	100
RTOR Reduction (vph)	0	0	7	0	0	41	0	2	0	0	0	46
Lane Group Flow (vph)	116	304	4	4	327	38	0	42	0	0	126	54
Heavy Vehicles (%)	2%	3%	0%	0%	3%	2%	100%	0%	3%	2%	2%	2%
Turn Type	Prot		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases			4	8		8	2			6		6
Actuated Green, G (s)	9.5	33.4	33.4	19.9	19.9	19.9		48.6			48.6	48.6
Effective Green, g (s)	9.5	33.4	33.4	19.9	19.9	19.9		48.6			48.6	48.6
Actuated g/C Ratio	0.11	0.37	0.37	0.22	0.22	0.22		0.54			0.54	0.54
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	187	685	599	241	408	350		682			744	855
v/s Ratio Prot	c0.07	0.16			c0.18							
v/s Ratio Perm			0.00	0.00		0.02		0.03			c0.09	0.03
v/c Ratio	0.62	0.44	0.01	0.02	0.80	0.11		0.06			0.17	0.06
Uniform Delay, d1	38.5	21.3	17.8	27.4	33.2	28.0		9.9			10.5	9.9
Progression Factor	0.82	0.71	0.55	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	6.1	0.4	0.0	0.0	10.8	0.1		0.2			0.5	0.1
Delay (s)	37.8	15.5	9.9	27.4	44.0	28.1		10.0			11.0	10.0
Level of Service	D	B	A	C	D	C		B			B	B
Approach Delay (s)		21.4			40.8			10.0			10.5	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.8%	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												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	12	12
Grade (%)		-4%			4%			0%			0%	
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00		0.95	0.95			
Frt	1.00	1.00			1.00	0.85		0.86	0.85			
Flt Protected	0.95	1.00			1.00	1.00		1.00	1.00			
Satd. Flow (prot)	1805	3347			3893	1493		1535	1519			
Flt Permitted	0.95	1.00			1.00	1.00		1.00	1.00			
Satd. Flow (perm)	1805	3347			3893	1493		1535	1519			
Volume (vph)	49	708	0	0	627	756	33	0	669	0	0	0
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)	53	770	0	0	682	822	36	0	727	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	380	0	154	154	0	0	0
Lane Group Flow (vph)	53	770	0	0	682	442	0	242	213	0	0	0
Heavy Vehicles (%)	2%	10%	0%	0%	3%	6%	2%	2%	1%	0%	0%	0%
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	3.6	56.0			48.4	48.4		26.0	26.0			
Effective Green, g (s)	3.6	56.0			48.4	48.4		26.0	26.0			
Actuated g/C Ratio	0.04	0.62			0.54	0.54		0.29	0.29			
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)	72	2083			2094	803		443	439			
v/s Ratio Prot	c0.03	0.23			0.18							
v/s Ratio Perm						c0.30		0.16	0.14			
v/c Ratio	0.74	0.37			0.33	0.55		0.55	0.48			
Uniform Delay, d1	42.7	8.3			11.7	13.7		27.0	26.5			
Progression Factor	0.37	0.07			0.90	1.77		1.00	1.00			
Incremental Delay, d2	31.0	0.3			0.3	2.2		4.8	3.8			
Delay (s)	46.8	0.9			10.9	26.4		31.8	30.3			
Level of Service	D	A			B	C		C	C			
Approach Delay (s)		3.8			19.4			31.0			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	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												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-4%			0%			0%	
Total Lost time (s)		4.0		4.0	4.0					4.0		4.0
Lane Util. Factor		1.00		0.97	1.00					0.97		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)		1770		3434	1900					3183		1583
Flt Permitted		1.00		0.95	1.00					0.95		1.00
Satd. Flow (perm)		1770		3434	1900					3183		1583
Volume (vph)	0	86	25	573	87	0	0	0	0	671	0	76
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	93	27	623	95	0	0	0	0	729	0	83
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	0	59
Lane Group Flow (vph)	0	108	0	623	95	0	0	0	0	729	0	24
Heavy Vehicles (%)	0%	2%	2%	4%	2%	0%	0%	0%	0%	10%	0%	2%
Turn Type				Prot						Prot		custom
Protected Phases		2		1	6					4		
Permitted Phases												4
Actuated Green, G (s)		16.8		35.7	56.5					25.5		25.5
Effective Green, g (s)		16.8		35.7	56.5					25.5		25.5
Actuated g/C Ratio		0.19		0.40	0.63					0.28		0.28
Clearance Time (s)		4.0		4.0	4.0					4.0		4.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		330		1362	1193					902		449
v/s Ratio Prot		c0.06		c0.18	0.05					c0.23		
v/s Ratio Perm												0.01
v/c Ratio		0.33		0.46	0.08					0.81		0.05
Uniform Delay, d1		31.7		20.0	6.6					30.0		23.5
Progression Factor		1.00		0.52	0.87					1.00		1.00
Incremental Delay, d2		0.6		1.1	0.1					5.4		0.0
Delay (s)		32.3		11.5	5.8					35.4		23.5
Level of Service		C		B	A					D		C
Approach Delay (s)		32.3			10.8			0.0			34.1	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	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												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	23	0	128	30	5	0	0	80	8	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	25	0	139	33	5	0	0	87	9	0	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	25	177	87	9
Volume Left (vph)	0	139	0	9
Volume Right (vph)	0	5	87	0
Hadj (s)	0.03	0.17	-0.57	0.22
Departure Headway (s)	4.3	4.3	3.8	4.7
Degree Utilization, x	0.03	0.21	0.09	0.01
Capacity (veh/h)	804	819	893	723
Control Delay (s)	7.5	8.4	7.2	7.7
Approach Delay (s)	7.5	8.4	7.2	7.7
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
HCM Level of Service	A		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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
Frt		0.96		1.00	1.00					1.00		0.85
Flt Protected		1.00		0.95	1.00					0.95		1.00
Satd. Flow (prot)		1790		1770	1863					1770		1583
Flt Permitted		1.00		0.95	1.00					0.95		1.00
Satd. Flow (perm)		1790		1770	1863					1770		1583
Volume (vph)	0	421	173	99	213	0	0	0	0	122	0	255
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	458	188	108	232	0	0	0	0	133	0	277
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	0	232
Lane Group Flow (vph)	0	628	0	108	232	0	0	0	0	133	0	45
Turn Type				Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases										4		4
Actuated Green, G (s)		33.5		4.8	42.3					9.7		9.7
Effective Green, g (s)		33.5		4.8	42.3					9.7		9.7
Actuated g/C Ratio		0.56		0.08	0.70					0.16		0.16
Clearance Time (s)		4.0		4.0	4.0					4.0		4.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		999		142	1313					286		256
v/s Ratio Prot		c0.35		c0.06	0.12							
v/s Ratio Perm										c0.08		0.03
v/c Ratio		0.63		0.76	0.18					0.47		0.17
Uniform Delay, d1		9.0		27.0	3.0					22.8		21.7
Progression Factor		1.00		0.83	0.70					1.00		1.00
Incremental Delay, d2		3.0		20.9	0.3					1.2		0.3
Delay (s)		12.0		43.5	2.4					24.0		22.0
Level of Service		B		D	A					C		C
Approach Delay (s)		12.0			15.4			0.0			22.7	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
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)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	1863	1770	1583
Volume (vph)	282	261	82	178	134	47
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	307	284	89	193	146	51
RTOR Reduction (vph)	0	142	0	0	0	42
Lane Group Flow (vph)	307	142	89	193	146	9
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	30.1	30.1	7.2	41.3	10.7	10.7
Effective Green, g (s)	30.1	30.1	7.2	41.3	10.7	10.7
Actuated g/C Ratio	0.50	0.50	0.12	0.69	0.18	0.18
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)	935	794	212	1282	316	282
v/s Ratio Prot	c0.16		c0.05	0.10	c0.08	
v/s Ratio Perm		0.09				0.01
v/c Ratio	0.33	0.18	0.42	0.15	0.46	0.03
Uniform Delay, d1	8.9	8.2	24.5	3.3	22.1	20.4
Progression Factor	0.48	2.20	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.4	1.3	0.2	1.1	0.0
Delay (s)	5.1	18.4	25.8	3.5	23.1	20.4
Level of Service	A	B	C	A	C	C
Approach Delay (s)	11.5			10.5	22.4	
Approach LOS	B			B	C	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.8%	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												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
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	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		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)	3433	3934	1615	1805	3497	1583	1805	1723		1770	1863	2787
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)	3433	3934	1615	1805	3497	1583	1805	1723		1770	1863	2787
Volume (vph)	993	284	36	10	302	96	88	10	17	96	10	993
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)	1079	309	39	11	328	104	96	11	18	104	11	1079
RTOR Reduction (vph)	0	0	15	0	0	76	0	16	0	0	0	350
Lane Group Flow (vph)	1079	309	24	11	328	28	96	13	0	104	11	729
Heavy Vehicles (%)	2%	4%	0%	0%	17%	2%	0%	0%	0%	2%	2%	2%
Turn Type	Prot		Perm	Prot		Perm	Split			Split		pm+ov
Protected Phases	5	2		1	6		8	8		4	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	33.2	56.3	56.3	1.2	24.3	24.3	9.5	9.5		7.0	7.0	40.2
Effective Green, g (s)	33.2	56.3	56.3	1.2	24.3	24.3	9.5	9.5		7.0	7.0	40.2
Actuated g/C Ratio	0.37	0.63	0.63	0.01	0.27	0.27	0.11	0.11		0.08	0.08	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1266	2461	1010	24	944	427	191	182		138	145	1369
v/s Ratio Prot	c0.31	0.08		0.01	c0.09		c0.05	0.01		c0.06	0.01	0.20
v/s Ratio Perm			0.02			0.02						0.07
v/c Ratio	0.85	0.13	0.02	0.46	0.35	0.07	0.50	0.07		0.75	0.08	0.53
Uniform Delay, d1	26.1	6.8	6.4	44.1	26.5	24.4	38.0	36.3		40.7	38.5	18.1
Progression Factor	0.59	0.69	0.82	1.06	0.35	0.10	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.1	0.1	0.0	10.5	0.8	0.2	2.1	0.2		20.5	0.2	0.4
Delay (s)	20.4	4.8	5.3	57.2	10.0	2.8	40.1	36.4		61.2	38.7	18.5
Level of Service	C	A	A	E	A	A	D	D		E	D	B
Approach Delay (s)		16.6			9.4			39.2			22.4	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	26	26	26	176	182	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	28	28	191	198	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				332		
pX, platoon unblocked						
vC, conflicting volume	460	113	226			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	460	113	226			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	98			
cM capacity (veh/h)	519	918	1340			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	28	28	28	191	132	94
Volume Left	28	0	28	0	0	0
Volume Right	0	28	0	0	0	28
cSH	519	918	1340	1700	1700	1700
Volume to Capacity	0.05	0.03	0.02	0.11	0.08	0.06
Queue Length 95th (ft)	4	2	2	0	0	0
Control Delay (s)	12.3	9.0	7.7	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.7		1.0		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	17	18	18	184	190	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	20	20	200	207	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				542		
pX, platoon unblocked						
vC, conflicting volume	455	112	225			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	455	112	225			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	98	99			
cM capacity (veh/h)	526	919	1341			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	18	20	20	200	138	87
Volume Left	18	0	20	0	0	0
Volume Right	0	20	0	0	0	18
cSH	526	919	1341	1700	1700	1700
Volume to Capacity	0.04	0.02	0.01	0.12	0.08	0.05
Queue Length 95th (ft)	3	2	1	0	0	0
Control Delay (s)	12.1	9.0	7.7	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.5		0.7		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	9	17	17	184	190	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	18	18	200	207	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				842		
pX, platoon unblocked						
vC, conflicting volume	448	211	216			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	448	211	216			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	99			
cM capacity (veh/h)	560	829	1353			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	10	18	218	216
Volume Left	10	0	18	0
Volume Right	0	18	0	10
cSH	560	829	1353	1700
Volume to Capacity	0.02	0.02	0.01	0.13
Queue Length 95th (ft)	1	2	1	0
Control Delay (s)	11.5	9.4	0.8	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.2		0.8	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	9	9	9	184	190	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	10	10	200	207	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				1052		
pX, platoon unblocked						
vC, conflicting volume	431	211	216			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	431	211	216			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	577	829	1353			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	10	10	210	216
Volume Left	10	0	10	0
Volume Right	0	10	0	10
cSH	577	829	1353	1700
Volume to Capacity	0.02	0.01	0.01	0.13
Queue Length 95th (ft)	1	1	1	0
Control Delay (s)	11.3	9.4	0.4	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.4		0.4	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

SimTraffic Post-Processor
Average Results from 10 Runs
Queue Length

Knighton & Churn Creek
Existing Plus Project With Mitigation Conditions
PM Peak Hour

Intersection 9 **Knighton Rd & Churn Creek Rd (West)** **Signalized**

Direction	Movement	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time %
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	
NB	Left Turn	1,216	22	9	73	22	85	20	0
	Through	1,216	22	9	73	22	85	20	0
	Right Turn	1,216	22	9	73	22	85	20	0
SB	Left Turn	226	38	22	93	38	98	36	0
	Through	226	38	22	93	38	98	36	0
	Right Turn	226	34	9	69	29	73	34	0
EB	Left Turn	221	82	12	135	27	141	29	0
	Through	221	112	22	198	39	199	40	1
	Right Turn	221	34	9	69	29	73	34	0
WB	Left Turn								
	Through	2,683	121	124	186	178	210	198	24
	Right Turn	60	**131**	112	**214**	142	**219**	135	25

Intersection 10 **Knighton Rd & I-5 NB Ramps** **Signalized**

Direction	Movement	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time %
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	
NB	Left Turn	1,286	128	19	190	26	196	31	0
	Through								
	Right Turn	250	114	19	176	30	180	36	0
SB	Left Turn								
	Through								
	Right Turn								
EB	Left Turn	100	**114**	19	**176**	31	**180**	36	0
	Through	485	114	19	176	30	180	44	0
	Right Turn								
WB	Left Turn								
	Through	470	175	24	287	74	289	89	1
	Right Turn	470	68	16	118	47	121	48	0

Intersection 11 **Knighton Rd & I-5 SB Ramps** **Signalized**

Direction	Movement	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time %
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	
NB	Left Turn								
	Through								
	Right Turn								
SB	Left Turn	500	286	34	449	83	458	96	14
	Through								
	Right Turn	250	54	30	160	99	187	117	0
EB	Left Turn								
	Through	238	83	29	144	42	142	41	0
	Right Turn	238	83	29	144	42	142	41	0
WB	Left Turn	300	98	19	172	36	176	46	0
	Through	485	30	6	73	19	74	27	0
	Right Turn								

SimTraffic Post-Processor
Average Results from 10 Runs
Queue Length

Knighton & Churn Creek
Existing Plus Project With Mitigation Conditions
PM Peak Hour

Intersection 15 **Knighton Rd & Main Project Access** **Signalized**

Direction	Movement	Storage (ft)	Average Queue (ft)		95th Queue (ft)		Maximum Queue (ft)		Block Time %
			Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	
NB	Left Turn	155	58	21	96	34	94	38	0
	Through	155	26	14	51	17	48	22	0
	Right Turn	155	26	14	51	17	48	22	0
SB	Left Turn	1,472	148	98	194	109	193	105	0
	Through	1,472	37	59	69	83	73	88	0
	Right Turn	1,472	196	44	336	68	353	76	0
EB	Left Turn	470	217	98	238	109	229	105	42
	Through	470	37	59	76	83	78	88	0
	Right Turn	470	196	20	336	64	353	69	0
WB	Left Turn	140	12	12	34	18	40	20	0
	Through	221	99	40	176	68	174	69	1
	Right Turn	221	36	15	85	41	87	58	0

HCM 2000 **HCM 2000**
Basic Freeway Segr **Basic Freeway Segments**
Capacity Analysis **Capacity Analysis**

Jurisdiction CalTrans
Analysis Year
Analyst Fehr & Peers

Agency or Company
Date 6/12/2009
Project Description Knighton and Churn Creek Commons

General Information **Existing plus Project + MITIGATION**

	Freeway/ Direction	From/To	Analysis Time Period	Weekday Saturday % Distribution	Generation 2439 3155 No Project	*Flow Rate Calculation* Volume (vph)	PHF	Lanes	HOV Lane?	HOV Lane Volume	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcphpl)
1013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	PM	0.125	1986	2,204	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	836
1011	I-5 NB	Riverside Avenue / Knighton Road	PM	0.175	2009	2,366	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	900
1009	I-5 NB	Knighton Road / S Bonneview Road	PM	0.205	2059	2,469	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	939
1007	I-5 NB	Bonnyview Road / Cypress Avenue	PM	0.125	2049	2,531	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	963
1005	I-5 NB	Cypress Avenue / CA Highway 44	PM	0.125	2693	3,291	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,252
1006	I-5 SB	CA Highway 44 / Cypress Avenue	PM	0.125	2596	2,895	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,101
1008	I-5 SB	Cypress Avenue / Bonnyview Road	PM	0.125	2235	2,756	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,048
1010	I-5 SB	S Bonneview Road / Knighton Road	PM	0.205	2503	2,860	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,088
1012	I-5 SB	Knighton Road / Riverside Avenue	PM	0.175	2406	2,711	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,031
1014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	PM	0.125	2659	2,606	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	991
2013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	Saturday	0.125	1802.12942	2,260	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	860
2011	I-5 NB	Riverside Avenue / Knighton Road	Saturday	0.175	1823	2,629	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,000
2009	I-5 NB	Knighton Road / S Bonneview Road	Saturday	0.205	2043	2,912	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,108
2007	I-5 NB	Bonnyview Road / Cypress Avenue	Saturday	0.125	2395	2,870	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,092
2005	I-5 NB	Cypress Avenue / CA Highway 44	Saturday	0.125	2027	4,044	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,538
2006	I-5 SB	CA Highway 44 / Cypress Avenue	Saturday	0.125	1701	2,288	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	870
2008	I-5 SB	Cypress Avenue / Bonnyview Road	Saturday	0.125	2142	1,995	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	759
2010	I-5 SB	S Bonneview Road / Knighton Road	Saturday	0.205	1592	2,040	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	776
2012	I-5 SB	Knighton Road / Riverside Avenue	Saturday	0.175	1448	1,827	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	695
2014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	Saturday	0.125	1600.26268	1,618	0.92	3	No		Level			10.0%	0.0%	1.5	1.2	0.95	1.00	616

HCM 2000 **HCM 2000**
Basic Freeway Segr **Basic Freeway Segments**
Capacity Analysis **Capacity Analysis**

General Information **Existing plus Project + MITIGATION**

	Freeway/ Direction	From/To	Analysis Time Period	*Speed Calculation* BFFS (mph)	Lane Width (ft)	f_{LW}	R. Shoulder Width (ft)	f_{LC}	f_N	IC Density (per mi)	f_{ID}	Calculated FFS (mph)	Measured FFS (mph)	FFS (mph)	S (mph)	*Results* Density, D (pcplpm)	Level of Service
1013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	PM										65.0	65.0	65.0	12.9	B
1011	I-5 NB	Riverside Avenue / Knighton Road	PM										65.0	65.0	65.0	13.8	B
1009	I-5 NB	Knighton Road / S Bonneview Road	PM										65.0	65.0	65.0	14.5	B
1007	I-5 NB	Bonnyview Road / Cypress Avenue	PM										65.0	65.0	65.0	14.8	B
1005	I-5 NB	Cypress Avenue / CA Highway 44	PM										65.0	65.0	65.0	19.3	C
1006	I-5 SB	CA Highway 44 / Cypress Avenue	PM										65.0	65.0	65.0	16.9	B
1008	I-5 SB	Cypress Avenue / Bonnyview Road	PM										65.0	65.0	65.0	16.1	B
1010	I-5 SB	S Bonneview Road / Knighton Road	PM										65.0	65.0	65.0	16.7	B
1012	I-5 SB	Knighton Road / Riverside Avenue	PM										65.0	65.0	65.0	15.9	B
1014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	PM										65.0	65.0	65.0	15.3	B
2013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	Saturday										65.0	65.0	65.0	13.2	B
2011	I-5 NB	Riverside Avenue / Knighton Road	Saturday										65.0	65.0	65.0	15.4	B
2009	I-5 NB	Knighton Road / S Bonneview Road	Saturday										65.0	65.0	65.0	17.0	B
2007	I-5 NB	Bonnyview Road / Cypress Avenue	Saturday										65.0	65.0	65.0	16.8	B
2005	I-5 NB	Cypress Avenue / CA Highway 44	Saturday										65.0	65.0	65.0	23.7	C
2006	I-5 SB	CA Highway 44 / Cypress Avenue	Saturday										65.0	65.0	65.0	13.4	B
2008	I-5 SB	Cypress Avenue / Bonnyview Road	Saturday										65.0	65.0	65.0	11.7	B
2010	I-5 SB	S Bonneview Road / Knighton Road	Saturday										65.0	65.0	65.0	11.9	B
2012	I-5 SB	Knighton Road / Riverside Avenue	Saturday										65.0	65.0	65.0	10.7	A
2014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	Saturday										65.0	65.0	65.0	9.5	A

HCM 2000 **HCM 2000**
Merge Ramp Junct **Merge Ramp Junctions**
Capacity Analysis **Capacity Analysis**

Jurisdiction CalTrans
Analysis Year 0
Analyst Fehr & Peers

Agency or Company 0
Date 6/12/2009
Project Description Knighton and Churn Creek Commons

General Information **Existing plus Project** + MIT.

				Freeway Data					*Freeway Volume Adjustment*											*On-Ramp Data*	
ID	Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	Type	Lanes
1013	I-5 NB	Riverside Avenue	PM	3	0	2,023	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,309	Right	1
1011	I-5 NB	Knighton Road	PM	3	0	1,664	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	1,899	Right	1
1009	I-5 NB	Bonnyview Road	PM	3	0	1,914	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,184	Right	1
1007	I-5 NB	Cypress Avenue	PM	3	0	2,087	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,382	Right	1
1006	I-5 SB	Cypress Avenue	PM	3	0	2,100	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,397	Right	1
1008	I-5 SB	Bonnyview Road	PM	3	0	2,186	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,495	Right	1
1010	I-5 SB	Knighton Road	PM	3	0	2,113	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,412	Right	1
1012	I-5 SB	Riverside Avenue	PM	3	0	2,334	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,664	Right	1
2013	I-5 NB	Riverside Avenue	Saturday	3	0	2,160	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,465	Right	1
2011	I-5 NB	Knighton Road	Saturday	3	0	1,930	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,203	Right	1
2009	I-5 NB	Bonnyview Road	Saturday	3	0	2,379	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,715	Right	1
2007	I-5 NB	Cypress Avenue	Saturday	3	0	2,674	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	3,052	Right	1
2006	I-5 SB	Cypress Avenue	Saturday	3	0	1,688	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	1,927	Right	1
2008	I-5 SB	Bonnyview Road	Saturday	3	0	1,520	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	1,735	Right	1
2010	I-5 SB	Knighton Road	Saturday	3	0	1,193	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	1,362	Right	1
2012	I-5 SB	Riverside Avenue	Saturday	3	0	1,498	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	1,710	Right	1

HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge Ramp Junctions Capacity Analysis** | Juri Analys

General Information **Existing plus Project + MIT**

On-Ramp Volume Adjustment

ID	Freeway/ Direction	On-ramp	Analysis Time Period	S_{FR} (mph)	V_R (vph)	Accel Lane (ft) L_{A1}	L_{A2}	L_{Aeff}	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	35.0	343	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	391
1011	I-5 NB	Knighton Road	PM	35.0	805	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	919
1009	I-5 NB	Bonnyview Road	PM	35.0	617	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	704
1007	I-5 NB	Cypress Avenue	PM	35.0	1,204	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	1,374
1006	I-5 SB	Cypress Avenue	PM	35.0	656	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	749
1008	I-5 SB	Bonnyview Road	PM	35.0	674	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	769
1010	I-5 SB	Knighton Road	PM	35.0	598	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	683
1012	I-5 SB	Riverside Avenue	PM	35.0	272	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	310
2013	I-5 NB	Riverside Avenue	Saturday	35.0	469	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	535
2011	I-5 NB	Knighton Road	Saturday	35.0	982	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	1,121
2009	I-5 NB	Bonnyview Road	Saturday	35.0	491	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	560
2007	I-5 NB	Cypress Avenue	Saturday	35.0	1,370	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	1,564
2006	I-5 SB	Cypress Avenue	Saturday	35.0	307	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	350
2008	I-5 SB	Bonnyview Road	Saturday	35.0	520	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	593
2010	I-5 SB	Knighton Road	Saturday	35.0	634	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	724
2012	I-5 SB	Riverside Avenue	Saturday	35.0	120	100	0	100	0.92	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	137

HCM 2000 Merge Ramp Junct Capacity Analysis **HCM 2000 Merge Ramp Junctions Capacity Analysis**

Juri
Analy:

General Information **Existing plus Project** *Adjacent Upstream Ramp Data*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	Off	600	181	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	207
1011	I-5 NB	Knighton Road	PM	Off	1,400	702	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	801
1009	I-5 NB	Bonnyview Road	PM	Off	1,450	555	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	633
1007	I-5 NB	Cypress Avenue	PM	Off	1,650	444	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	507
1006	I-5 SB	Cypress Avenue	PM	Off	1,650	795	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	907
1008	I-5 SB	Bonnyview Road	PM	Off	1,450	570	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	651
1010	I-5 SB	Knighton Road	PM	Off	1,400	747	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	853
1012	I-5 SB	Riverside Avenue	PM	Off	1,150	377	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	430
2013	I-5 NB	Riverside Avenue	Saturday	Off	600	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	114
2011	I-5 NB	Knighton Road	Saturday	Off	1,400	699	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	798
2009	I-5 NB	Bonnyview Road	Saturday	Off	1,450	533	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	608
2007	I-5 NB	Cypress Avenue	Saturday	Off	1,650	196	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	224
2006	I-5 SB	Cypress Avenue	Saturday	Off	1,650	600	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	685
2008	I-5 SB	Bonnyview Road	Saturday	Off	1,450	475	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	542
2010	I-5 SB	Knighton Road	Saturday	Off	1,400	847	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	967
2012	I-5 SB	Riverside Avenue	Saturday	Off	1,150	329	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	375

HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge Ramp Junctions Capacity Analysis** | Juri Analys

General Information **Existing plus Project + MIT** *Adjacent Downstream Ramp Data* *v_{12} Estimation*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-2	L_{EQ} 25-3	P_{FM} Equations 1	P_{FM} Equations 2	P_{FM} Equations 3
1013	I-5 NB	Riverside Avenue	PM	No														50	9,487	0.580	0.727	
1011	I-5 NB	Knighton Road	PM	No														76	9,487	0.580	0.776	
1009	I-5 NB	Bonnyview Road	PM	No														91	9,487	0.580	0.778	
1007	I-5 NB	Cypress Avenue	PM	No														276	9,487	0.580	0.779	
1006	I-5 SB	Cypress Avenue	PM	No														146	9,487	0.580	0.787	
1008	I-5 SB	Bonnyview Road	PM	No														171	9,487	0.580	0.773	
1010	I-5 SB	Knighton Road	PM	No														135	9,487	0.580	0.772	
1012	I-5 SB	Riverside Avenue	PM	No														109	9,487	0.580	0.758	
2013	I-5 NB	Riverside Avenue	Saturday	No														115	9,487	0.580	0.723	
2011	I-5 NB	Knighton Road	Saturday	No														184	9,487	0.580	0.769	
2009	I-5 NB	Bonnyview Road	Saturday	No														174	9,487	0.580	0.773	
2007	I-5 NB	Cypress Avenue	Saturday	No														460	9,487	0.580	0.767	
2006	I-5 SB	Cypress Avenue	Saturday	No														-40	9,487	0.580	0.799	
2008	I-5 SB	Bonnyview Road	Saturday	No														-29	9,487	0.580	0.786	
2010	I-5 SB	Knighton Road	Saturday	No														-81	9,487	0.580	0.786	
2012	I-5 SB	Riverside Avenue	Saturday	No														-132	9,487	0.580	0.773	

HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge Ramp Junctions Capacity Analysis** | Juri Analys

General Information **Existing plus Project** AM IT

ID	Freeway/ Direction	On-ramp	Analysis Time Period	P_{FM}	v_{12} (pcph)
1013	I-5 NB	Riverside Avenue	PM	0.580	1,340
1011	I-5 NB	Knighton Road	PM	0.580	1,102
1009	I-5 NB	Bonnyview Road	PM	0.580	1,268
1007	I-5 NB	Cypress Avenue	PM	0.580	1,382
1006	I-5 SB	Cypress Avenue	PM	0.580	1,391
1008	I-5 SB	Bonnyview Road	PM	0.580	1,448
1010	I-5 SB	Knighton Road	PM	0.580	1,399
1012	I-5 SB	Riverside Avenue	PM	0.580	1,546
2013	I-5 NB	Riverside Avenue	Saturday	0.580	1,431
2011	I-5 NB	Knighton Road	Saturday	0.580	1,278
2009	I-5 NB	Bonnyview Road	Saturday	0.580	1,576
2007	I-5 NB	Cypress Avenue	Saturday	0.580	1,771
2006	I-5 SB	Cypress Avenue	Saturday	0.580	1,118
2008	I-5 SB	Bonnyview Road	Saturday	0.580	1,007
2010	I-5 SB	Knighton Road	Saturday	0.580	790
2012	I-5 SB	Riverside Avenue	Saturday	0.580	992

HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge Ramp Junctions Capacity Analysis** | Juri Analys

General Information **Existing plus Project → MIT** *Capacity Checks*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	v_{F_i} (pcph)	Max v_{F_i} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	v_{R12a} (pcph)	Max v_{R12a} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1013	I-5 NB	Riverside Avenue	PM	2,309	6,750	No	2,700	6,750	No	969	No	No	1,340	1,731	4,600	No	391	2,000	No
1011	I-5 NB	Knighton Road	PM	1,899	6,750	No	2,818	6,750	No	797	No	No	1,102	2,021	4,600	No	919	2,000	No
1009	I-5 NB	Bonnyview Road	PM	2,184	6,750	No	2,889	6,750	No	917	No	No	1,268	1,972	4,600	No	704	2,000	No
1007	I-5 NB	Cypress Avenue	PM	2,382	6,750	No	3,756	6,750	No	1,000	No	No	1,382	2,756	4,600	No	1,374	2,000	No
1006	I-5 SB	Cypress Avenue	PM	2,397	6,750	No	3,145	6,750	No	1,006	No	No	1,391	2,140	4,600	No	749	2,000	No
1008	I-5 SB	Bonnyview Road	PM	2,495	6,750	No	3,264	6,750	No	1,047	No	No	1,448	2,217	4,600	No	769	2,000	No
1010	I-5 SB	Knighton Road	PM	2,412	6,750	No	3,094	6,750	No	1,012	No	No	1,399	2,082	4,600	No	683	2,000	No
1012	I-5 SB	Riverside Avenue	PM	2,664	6,750	No	2,974	6,750	No	1,118	No	No	1,546	1,856	4,600	No	310	2,000	No
2013	I-5 NB	Riverside Avenue	Saturday	2,465	6,750	No	3,000	6,750	No	1,035	No	No	1,431	1,966	4,600	No	535	2,000	No
2011	I-5 NB	Knighton Road	Saturday	2,203	6,750	No	3,323	6,750	No	924	No	No	1,278	2,399	4,600	No	1,121	2,000	No
2009	I-5 NB	Bonnyview Road	Saturday	2,715	6,750	No	3,276	6,750	No	1,140	No	No	1,576	2,136	4,600	No	560	2,000	No
2007	I-5 NB	Cypress Avenue	Saturday	3,052	6,750	No	4,615	6,750	No	1,281	No	No	1,771	3,335	4,600	No	1,564	2,000	No
2006	I-5 SB	Cypress Avenue	Saturday	1,927	6,750	No	2,277	6,750	No	809	No	No	1,118	1,468	4,600	No	350	2,000	No
2008	I-5 SB	Bonnyview Road	Saturday	1,735	6,750	No	2,328	6,750	No	728	No	No	1,007	1,600	4,600	No	593	2,000	No
2010	I-5 SB	Knighton Road	Saturday	1,362	6,750	No	2,085	6,750	No	571	No	No	790	1,514	4,600	No	724	2,000	No
2012	I-5 SB	Riverside Avenue	Saturday	1,710	6,750	No	1,847	6,750	No	718	No	No	992	1,129	4,600	No	137	2,000	No

HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge Ramp Junctions Capacity Analysis** | Juri Analy:

General Information **Existing plus Project + mit** *Results* *Speed Estimation*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Density, D (pcplpm)	Level of Service	Int. Var. M_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1013	I-5 NB	Riverside Avenue	PM	**18.2**	**B**	0.336	14.1	-1.7	-6.0
1011	I-5 NB	Knighton Road	PM	**20.2**	**C**	0.343	14.4	-1.1	-4.7
1009	I-5 NB	Bonnyview Road	PM	**19.9**	**B**	0.342	14.4	-1.5	-6.1
1007	I-5 NB	Cypress Avenue	PM	**25.7**	**C**	0.375	15.8	-1.8	-9.9
1006	I-5 SB	Cypress Avenue	PM	**21.2**	**C**	0.347	14.6	-1.8	-7.8
1008	I-5 SB	Bonnyview Road	PM	**21.8**	**C**	0.350	14.7	-2.0	-8.6
1010	I-5 SB	Knighton Road	PM	**20.8**	**C**	0.345	14.5	-1.8	-7.6
1012	I-5 SB	Riverside Avenue	PM	**19.2**	**B**	0.339	14.2	-2.2	-8.0
2013	I-5 NB	Riverside Avenue	Saturday	**19.9**	**B**	0.342	14.4	-1.9	-7.5
2011	I-5 NB	Knighton Road	Saturday	**23.0**	**C**	0.357	15.0	-1.5	-7.5
2009	I-5 NB	Bonnyview Road	Saturday	**21.3**	**C**	0.347	14.6	-2.3	-9.4
2007	I-5 NB	Cypress Avenue	Saturday	**30.1**	**D**	0.423	17.8	-2.8	-17.2
2006	I-5 SB	Cypress Avenue	Saturday	**16.1**	**B**	0.331	13.9	-1.1	-3.7
2008	I-5 SB	Bonnyview Road	Saturday	**17.1**	**B**	0.333	14.0	-0.8	-3.0
2010	I-5 SB	Knighton Road	Saturday	**16.3**	**B**	0.332	13.9	-0.3	-1.0
2012	I-5 SB	Riverside Avenue	Saturday	**13.6**	**B**	0.326	13.7	-0.8	-2.2

HCM 2000 Diverge Ramp Jun Capacity Analysis | **HCM 2000 Diverge Ramp Junctions Capacity Analysis**

Jurisdiction: CalTrans
Analysis Year: 0
Analyst: Fehr & Peers

Agency or Company: 0
Date: 6/12/2009
Project Description: Knighton and Churn Creek Commons

General Information **Existing plus Project + Mit**

Freeway Data | *Freeway Volume Adjustment*

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	3	0	2216	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,529
1011	I-5 NB	Knighton Road	PM	3	0	2423	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,765
1009	I-5 NB	Bonnyview Road	PM	3	0	2547	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,907
1007	I-5 NB	Cypress Avenue	PM	3	0	2554	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,915
1006	I-5 SB	Cypress Avenue	PM	3	0	2910	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	3,321
1008	I-5 SB	Bonnyview Road	PM	3	0	2796	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	3,191
1010	I-5 SB	Knighton Road	PM	3	0	2955	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	3,373
1012	I-5 SB	Riverside Avenue	PM	3	0	2785	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	3,179
2013	I-5 NB	Riverside Avenue	Saturday	3	0	2296	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,620
2011	I-5 NB	Knighton Road	Saturday	3	0	2714	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	3,098
2009	I-5 NB	Bonnyview Road	Saturday	3	0	3025	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	3,452
2007	I-5 NB	Cypress Avenue	Saturday	3	0	2905	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	3,315
2006	I-5 SB	Cypress Avenue	Saturday	3	0	2315	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,642
2008	I-5 SB	Bonnyview Road	Saturday	3	0	2055	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,345
2010	I-5 SB	Knighton Road	Saturday	3	0	2178	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,486
2012	I-5 SB	Riverside Avenue	Saturday	3	0	1936	No	0	0.92	Level	0	0	0.1	0	1.5	1.2	0.95	1	2,210

HCM 2000 Diverge Ramp Jun Capacity Analysis **HCM 2000 Diverge Ramp Junctions Capacity Analysis** Juri Analy

General Information **Existing plus Project** Effective

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	2,529
1011	I-5 NB	Knighton Road	PM	2,765
1009	I-5 NB	Bonnyview Road	PM	2,907
1007	I-5 NB	Cypress Avenue	PM	2,915
1006	I-5 SB	Cypress Avenue	PM	3,321
1008	I-5 SB	Bonnyview Road	PM	3,191
1010	I-5 SB	Knighton Road	PM	3,373
1012	I-5 SB	Riverside Avenue	PM	3,179
2013	I-5 NB	Riverside Avenue	Saturday	2,620
2011	I-5 NB	Knighton Road	Saturday	3,098
2009	I-5 NB	Bonnyview Road	Saturday	3,452
2007	I-5 NB	Cypress Avenue	Saturday	3,315
2006	I-5 SB	Cypress Avenue	Saturday	2,642
2008	I-5 SB	Bonnyview Road	Saturday	2,345
2010	I-5 SB	Knighton Road	Saturday	2,486
2012	I-5 SB	Riverside Avenue	Saturday	2,210

HCM 2000 **HCM 2000** Juri
Diverge Ramp Jun **Diverge Ramp Junctions** Analy:
Capacity Analysis **Capacity Analysis**

General Information **Existing plus Project + MIT** *Off-Ramp Data* *Off-Ramp Volume Adjustment*

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Type	Lanes	S_{FR} (mph)	V_R (vph)	Decel Lane (ft) L_{D1}	L_{D2}	L_{Deff}	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	Right	1	45.0	181	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	207
1011	I-5 NB	Knighton Road	PM	Right	1	45.0	624	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	712
1009	I-5 NB	Bonnyview Road	PM	Right	1	45.0	610	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	696
1007	I-5 NB	Cypress Avenue	PM	Right	1	45.0	469	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	535
1006	I-5 SB	Cypress Avenue	PM	Right	1	45.0	795	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	907
1008	I-5 SB	Bonnyview Road	PM	Right	1	45.0	570	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	651
1010	I-5 SB	Knighton Road	PM	Right	1	45.0	742	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	847
1012	I-5 SB	Riverside Avenue	PM	Right	1	45.0	412	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	470
2013	I-5 NB	Riverside Avenue	Saturday	Right	1	45.0	100	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	114
2011	I-5 NB	Knighton Road	Saturday	Right	1	45.0	587	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	670
2009	I-5 NB	Bonnyview Road	Saturday	Right	1	45.0	611	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	697
2007	I-5 NB	Cypress Avenue	Saturday	Right	1	45.0	230	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	263
2006	I-5 SB	Cypress Avenue	Saturday	Right	1	45.0	600	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	685
2008	I-5 SB	Bonnyview Road	Saturday	Right	1	45.0	475	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	542
2010	I-5 SB	Knighton Road	Saturday	Right	1	45.0	843	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	962
2012	I-5 SB	Riverside Avenue	Saturday	Right	1	45.0	378	100	0	100	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	431

HCM 2000 **HCM 2000** Juri
Diverge Ramp Jun **Diverge Ramp Junctions** Analy
Capacity Analysis **Capacity Analysis**

General Information **Existing plus Project** + M'IT *Adjacent Upstream Ramp Data*

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	No	400	500	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	571
1011	I-5 NB	Knighton Road	PM	No	400	500	0.92	Level	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1009	I-5 NB	Bonnyview Road	PM	No	400	500	0.92	Level	4.0%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1007	I-5 NB	Cypress Avenue	PM	No	[illegible]	500	0.92	Level	4.0%	[illegible]	10.0%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1006	I-5 SB	Cypress Avenue	PM	No	400	500	0.92	Level	4.0%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	571
1008	I-5 SB	Bonnyview Road	PM	No	[illegible]	500	0.92	Level	4.0%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.00	[illegible]
1010	I-5 SB	Knighton Road	PM	No	[illegible]	500	0.92	Level	4.0%	0.70	10.0%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1012	I-5 SB	Riverside Avenue	PM	No	[illegible]	500	0.92	Level	4.0%	0.70	10.0%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2013	I-5 NB	Riverside Avenue	Saturday	No	400	500	0.92	Level	4.0%	0.70	10.0%	0.0%	[illegible]	1.2	0.95	1.00	571
2011	I-5 NB	Knighton Road	Saturday	No	400	500	0.92	Level	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2009	I-5 NB	Bonnyview Road	Saturday	No	[illegible]	[illegible]	[illegible]	Level	4.0%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2007	I-5 NB	Cypress Avenue	Saturday	No	[illegible]	500	0.92	Level	[illegible]	0.70	10.0%	0.0%	1.5	1.2	0.95	[illegible]	[illegible]
2006	I-5 SB	Cypress Avenue	Saturday	No	[illegible]	500	0.92	Level	4.0%	[illegible]	[illegible]	[illegible]	1.5	1.2	0.95	1.00	571
2008	I-5 SB	Bonnyview Road	Saturday	No	[illegible]	500	0.92	Level	4.0%	[illegible]	[illegible]	[illegible]	1.5	1.2	0.95	1.00	571
2010	I-5 SB	Knighton Road	Saturday	No	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2012	I-5 SB	Riverside Avenue	Saturday	No	[illegible]	500	0.92	Level	[illegible]	[illegible]	[illegible]	0.0%	1.5	[illegible]	[illegible]	[illegible]	[illegible]

HCM 2000 Diverge Ramp Jun Capacity Analysis **HCM 2000 Diverge Ramp Junctions Capacity Analysis** Juri Analy:

General Information **Existing plus Project + MITI** *Adjacent Downstream Ramp Data* *v_{12} Estimation*

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-13	L_{EQ} 25-14	P_{FD}
1013	I-5 NB	Riverside Avenue	PM	On	600	343	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,029	1,150	0.687
1011	I-5 NB	Knighton Road	PM	On	1,400	805	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	7,091	1,429	0.658
1009	I-5 NB	Bonnyview Road	PM	On	1,450	617	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	6,718	1,426	0.655
1007	I-5 NB	Cypress Avenue	PM	On	1,650	1,204	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,861	1,328	0.663
1006	I-5 SB	Cypress Avenue	PM	On	1,650	656	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	7,276	1,610	0.635
1008	I-5 SB	Bonnyview Road	PM	On	1,450	674	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	6,010	1,413	0.650
1010	I-5 SB	Knighton Road	PM	On	1,400	598	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	6,777	1,564	0.637
1012	I-5 SB	Riverside Avenue	PM	On	1,150	272	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,266	1,305	0.659
2013	I-5 NB	Riverside Avenue	Saturday	On	600	469	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,655	1,115	0.689
2011	I-5 NB	Knighton Road	Saturday	On	1,400	982	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	6,248	1,420	0.652
2009	I-5 NB	Bonnyview Road	Saturday	On	1,450	491	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,858	1,459	0.642
2007	I-5 NB	Cypress Avenue	Saturday	On	1,650	1,370	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,483	1,205	0.665
2006	I-5 SB	Cypress Avenue	Saturday	On	1,650	307	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	7,158	1,404	0.662
2008	I-5 SB	Bonnyview Road	Saturday	On	1,450	520	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	6,814	1,304	0.676
2010	I-5 SB	Knighton Road	Saturday	On	1,400	634	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	10,366	1,595	0.654
2012	I-5 SB	Riverside Avenue	Saturday	On	1,150	120	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	6,409	1,240	0.685

General Information **Existing plus Project** + M IT

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	v_{12} (pcph)
1013	I-5 NB	Riverside Avenue	PM	1,803
1011	I-5 NB	Knighton Road	PM	2,063
1009	I-5 NB	Bonnyview Road	PM	2,145
1007	I-5 NB	Cypress Avenue	PM	2,112
1006	I-5 SB	Cypress Avenue	PM	2,441
1008	I-5 SB	Bonnyview Road	PM	2,303
1010	I-5 SB	Knighton Road	PM	2,455
1012	I-5 SB	Riverside Avenue	PM	2,255
2013	I-5 NB	Riverside Avenue	Saturday	1,842
2011	I-5 NB	Knighton Road	Saturday	2,252
2009	I-5 NB	Bonnyview Road	Saturday	2,465
2007	I-5 NB	Cypress Avenue	Saturday	2,293
2006	I-5 SB	Cypress Avenue	Saturday	1,981
2008	I-5 SB	Bonnyview Road	Saturday	1,762
2010	I-5 SB	Knighton Road	Saturday	1,958
2012	I-5 SB	Riverside Avenue	Saturday	1,649

HCM 2000 Diverge Ramp Jun Capacity Analysis | **HCM 2000 Diverge Ramp Junctions Capacity Analysis** | Juri Analy

General Information **Existing plus Project + MIT** *Capacity Checks*

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	Max v_{12} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1013	I-5 NB	Riverside Avenue	PM	2,529	6,750	No	726	No	No	1,803	4,400	No	2,323	6,750	No	207	2,100	No
1011	I-5 NB	Knighton Road	PM	2,765	6,750	No	702	No	No	2,063	4,400	No	2,053	6,750	No	712	2,100	No
1009	I-5 NB	Bonnyview Road	PM	2,907	6,750	No	762	No	No	2,145	4,400	No	2,211	6,750	No	696	2,100	No
1007	I-5 NB	Cypress Avenue	PM	2,915	6,750	No	803	No	No	2,112	4,400	No	2,380	6,750	No	535	2,100	No
1006	I-5 SB	Cypress Avenue	PM	3,321	6,750	No	880	No	No	2,441	4,400	No	2,414	6,750	No	907	2,100	No
1008	I-5 SB	Bonnyview Road	PM	3,191	6,750	No	888	No	No	2,303	4,400	No	2,541	6,750	No	651	2,100	No
1010	I-5 SB	Knighton Road	PM	3,373	6,750	No	918	No	No	2,455	4,400	No	2,526	6,750	No	847	2,100	No
1012	I-5 SB	Riverside Avenue	PM	3,179	6,750	No	924	No	No	2,255	4,400	No	2,708	6,750	No	470	2,100	No
2013	I-5 NB	Riverside Avenue	Saturday	2,620	6,750	No	779	No	No	1,842	4,400	No	2,506	6,750	No	114	2,100	No
2011	I-5 NB	Knighton Road	Saturday	3,098	6,750	No	845	No	No	2,252	4,400	No	2,428	6,750	No	670	2,100	No
2009	I-5 NB	Bonnyview Road	Saturday	3,452	6,750	No	987	No	No	2,465	4,400	No	2,755	6,750	No	697	2,100	No
2007	I-5 NB	Cypress Avenue	Saturday	3,315	6,750	No	1,023	No	No	2,293	4,400	No	3,053	6,750	No	263	2,100	No
2006	I-5 SB	Cypress Avenue	Saturday	2,642	6,750	No	661	No	No	1,981	4,400	No	1,957	6,750	No	685	2,100	No
2008	I-5 SB	Bonnyview Road	Saturday	2,345	6,750	No	583	No	No	1,762	4,400	No	1,803	6,750	No	542	2,100	No
2010	I-5 SB	Knighton Road	Saturday	2,486	6,750	No	528	No	No	1,958	4,400	No	1,524	6,750	No	962	2,100	No
2012	I-5 SB	Riverside Avenue	Saturday	2,210	6,750	No	560	No	No	1,649	4,400	No	1,778	6,750	No	431	2,100	No

HCM 2000 Diverge Ramp Jun Capacity Analysis | **HCM 2000 Diverge Ramp Junctions Capacity Analysis** | Juri Analy:

General Information **Existing plus Project + MIT** *Results* *Speed Estimation*

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Density, D (pcplpm)	Level of Service	Int. Var. D_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1013	I-5 NB	Riverside Avenue	PM	**18.9**	**B**	0.317	13.3	0.0	18.7
1011	I-5 NB	Knighton Road	PM	**21.1**	**C**	0.362	15.2	0.0	20.4
1009	I-5 NB	Bonnyview Road	PM	**21.8**	**C**	0.361	15.1	0.0	20.5
1007	I-5 NB	Cypress Avenue	PM	**21.5**	**C**	0.346	14.5	0.0	20.1
1006	I-5 SB	Cypress Avenue	PM	**24.3**	**C**	0.380	15.9	0.0	21.7
1008	I-5 SB	Bonnyview Road	PM	**23.2**	**C**	0.357	15.0	0.0	20.8
1010	I-5 SB	Knighton Road	PM	**24.5**	**C**	0.374	15.7	0.0	21.6
1012	I-5 SB	Riverside Avenue	PM	**22.7**	**C**	0.340	14.3	0.0	20.1
2013	I-5 NB	Riverside Avenue	Saturday	**19.2**	**B**	0.308	12.9	0.0	18.4
2011	I-5 NB	Knighton Road	Saturday	**22.7**	**C**	0.358	15.0	0.0	20.7
2009	I-5 NB	Bonnyview Road	Saturday	**24.6**	**C**	0.361	15.2	0.0	21.2
2007	I-5 NB	Cypress Avenue	Saturday	**23.1**	**C**	0.322	13.5	-0.1	-0.3
2006	I-5 SB	Cypress Avenue	Saturday	**20.4**	**C**	0.360	15.1	0.0	20.1
2008	I-5 SB	Bonnyview Road	Saturday	**18.5**	**B**	0.347	14.6	0.0	19.4
2010	I-5 SB	Knighton Road	Saturday	**20.2**	**C**	0.385	16.2	0.0	20.5
2012	I-5 SB	Riverside Avenue	Saturday	**17.5**	**B**	0.337	14.1	0.0	19.0

Leisch Method for Weaving Analysis

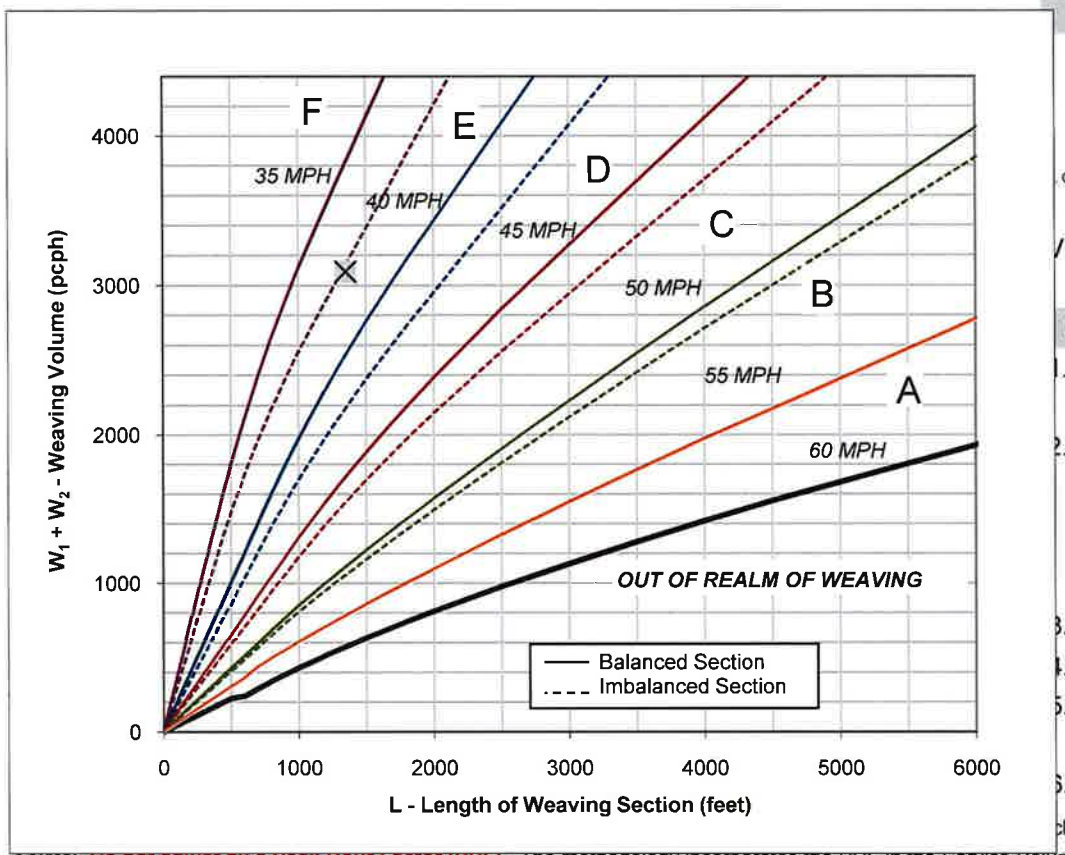
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,350

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,291	Volume (vph)*	1,204	Volume (vph)*	1,711
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,620	Volume (pcph)	1,294	Volume (pcph)	1,797

Project Information

Project	Knighton & Churn Creek
Scenario	Existing PP Mit Conditions - PM
Freeway	NB I-5
On-ramp	E. Cypress Avenue
Off-ramp	CA - 44



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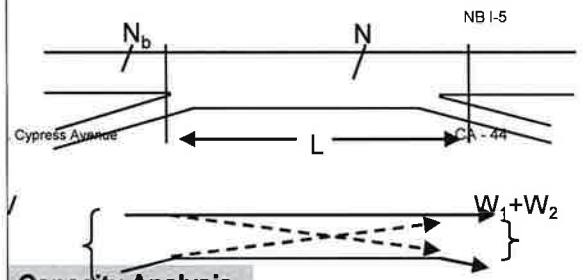


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   35 MPH and **40 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **30.2**
4. Weaving Intensity Factor (k) **3.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,552**
6. Level of Service (LOS) **C**

cluded.

* Note: Do not adjust by a Peak Hour Factor (PHF). The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983; *Highway Design Manual*, California Department of Transportation, July 24, 2009; and Freeway and Interchange Geometric Design Handbook, Institue of Transportation Engineers, 2005.

Leisch Method for Weaving Analysis

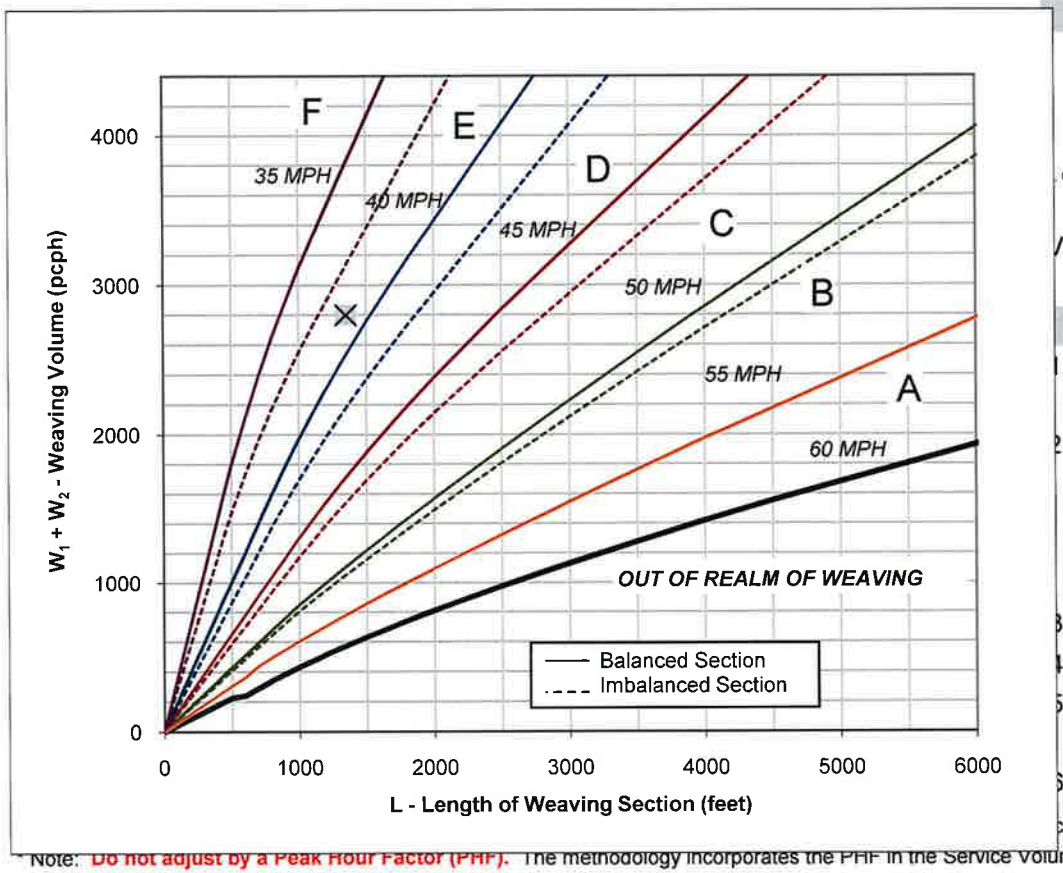
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,350

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,044	Volume (vph)*	1,370	Volume (vph)*	1,263
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,448	Volume (pcph)	1,473	Volume (pcph)	1,326

Project Information

Project	Knighton & Churn Creek
Scenario	Existing PP Mit Conditions - SAT
Freeway	NB I-5
On-ramp	E. Cypress Avenue
Off-ramp	CA - 44



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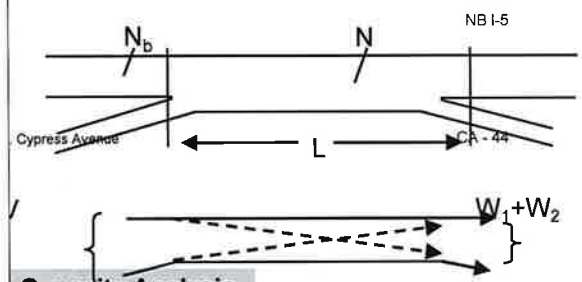


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   35 MPH and **40 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **31.7**
4. Weaving Intensity Factor (k) **3.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,775**
6. Level of Service (LOS) **D**

cluded.

* Note: Do not adjust by a Peak Hour Factor (PHF). The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983; *Highway Design Manual*, California Department of Transportation, July 24, 2009; and Freeway and Interchange Geometric Design Handbook, Institue of Transportation Engineers, 2005.

Leisch Method for Weaving Analysis

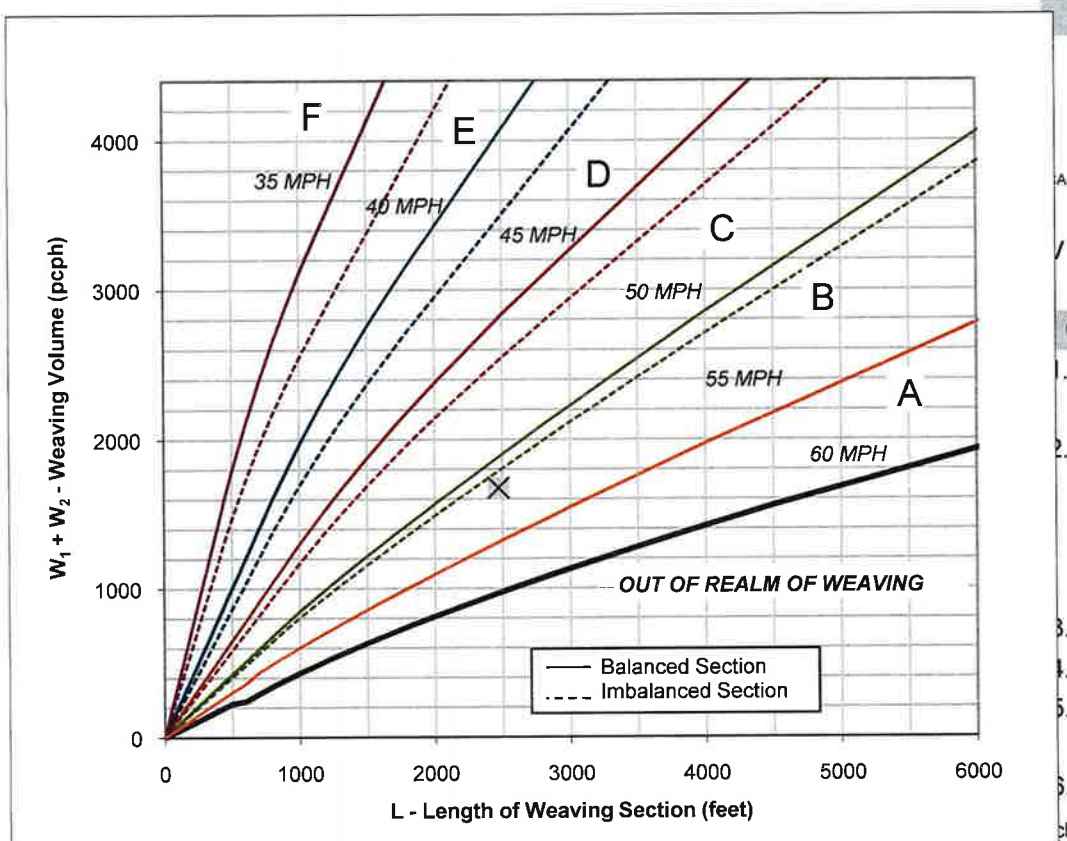
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,470

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,895	Volume (vph)*	781	Volume (vph)*	795
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,185	Volume (pcph)	840	Volume (pcph)	835

Project Information

Project	Knighton & Churn Creek
Scenario	Existing PP Mit Conditions - PM
Freeway	SB I-5
On-ramp	CA - 44
Off-ramp	E. Cypress Avenue



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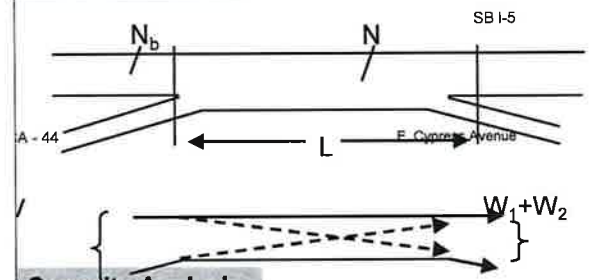


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   50 MPH and **55 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **46.2**
4. Weaving Intensity Factor (k) **1.80**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **962**
6. Level of Service (LOS) **B**

cluded.

* Note: Do not adjust by a Peak Hour Factor (PHF). The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983; *Highway Design Manual*, California Department of Transportation, July 24, 2009; and Freeway and Interchange Geometric Design Handbook, Institue of Transportation Engineers, 2005.

Leisch Method for Weaving Analysis

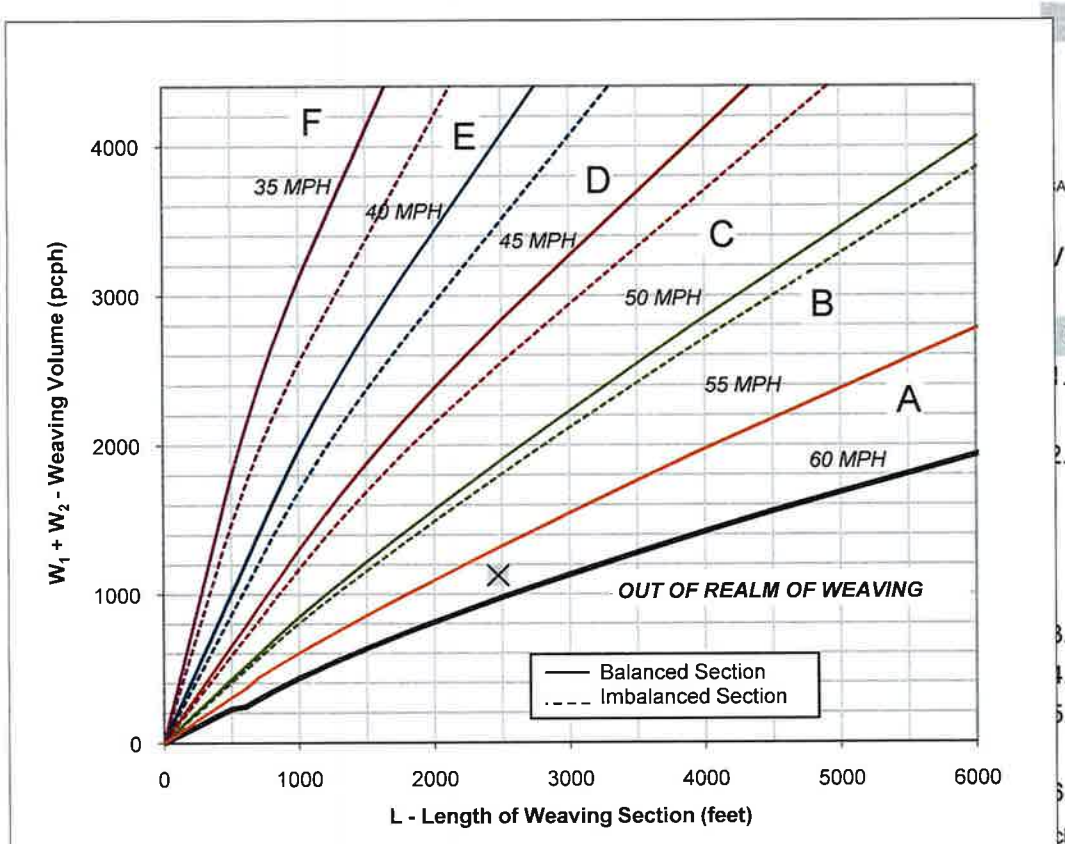
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,470

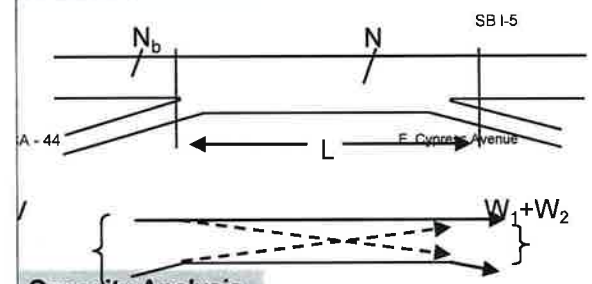
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,288	Volume (vph)*	462	Volume (vph)*	600
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	2,517	Volume (pcph)	497	Volume (pcph)	630

Project Information

Project	Knighton & Churn Creek
Scenario	Existing PP Mit Conditions - SAT
Freeway	SB I-5
On-ramp	CA - 44
Off-ramp	E. Cypress Avenue



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and **60 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **52.6**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **629**
6. Level of Service (LOS) **B**

cluded.

* Note: Do not adjust by a Peak Hour Factor (PHF). The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983; *Highway Design Manual*, California Department of Transportation, July 24, 2009; and Freeway and Interchange Geometric Design Handbook, Institue of Transportation Engineers, 2005.