APPENDIX C

FREEWAY MAINLINE FAIR SHARE – WEEKDAY PM PEAK HOUR

Freeway Direction	Segment		Existing	Cumulative No Project	Cumulative Plus Project	Fair Share % *
	From	To				
I-5 Northbound	North Street	Riverside Avenue	1,986	3,260	3,478	6%
	Riverside Avenue	Knighton Road	2,061	3,210	3,515	9%
	Knighton Road	S. Bonnyview Road	2,111	3,430	3,788	9%
	S. Bonnyview Road	Cypress Avenue	2,313	3,740	3,958	6%
	Cypress Avenue	CA Highway 44	3,134	4,450	4,607	3%
I-5 Southbound	CA Highway 44	Cypress Avenue	2,739	4,430	4,586	3%
	Cypress Avenue	S. Bonnyview Road	2,539	4,230	4,447	5%
	S. Bonnyview Road	Knighton Road	2,503	4,350	4,707	8%
	Knighton Road	Riverside Avenue	2,406	4,410	4,715	6%
	Riverside Avenue	North Street	2,388	4,650	4,868	4%

***** Fair Share Calculation for these freeway mainline segments are based on a revised formula (Project Traffic/Cumulative Plus Project Traffic) to account for existing unacceptable Level of Service at each location that the proposed project is not responsible for.

Source: Fehr & Peers, 2010 / Quad Knopf, 2010

FREEWAY MAINLINE FAIR SHARE – SATURDAY MIDDAY PEAK HOUR

Freeway Direction	Segment		Existing	Cumulative No Project	Cumulative Plus Project	Fair Share % *
	From	To				
I-5 Northbound	North Street	Riverside Avenue	1,987	3,260	3,533	8%
	Riverside Avenue	Knighton Road	2,247	3,670	4,052	9%
	Knighton Road	S. Bonnyview Road	2,467	3,960	4,405	10%
	S. Bonnyview Road	Cypress Avenue	2,599	4,210	4,481	6%
	Cypress Avenue	CA Highway 44	3,849	5,470	5,665	3%
I-5 Southbound	CA Highway 44	Cypress Avenue	2,092	3,380	3,576	5%
	Cypress Avenue	S. Bonnyview Road	1,722	2,940	3,213	8%
	S. Bonnyview Road	Knighton Road	1,592	2,710	3,158	14%
	Knighton Road	Riverside Avenue	1,448	2,520	2,899	13%
	Riverside Avenue	North Street	1,348	2,360	2,630	10%

***** Fair Share Calculation for these freeway mainline segments are based on a revised formula (Project Traffic/Cumulative Plus Project Traffic) to account for existing unacceptable Level of Service at each location that the proposed project is not responsible for.

Source: Fehr & Peers, 2010 / Quad Knopf 2010

INTERSECTION FAIR SHARE CALCULATIONS – WEEKDAY PM PEAK HOUR

Location	Existing	Cumulative No Project	Cumulative Plus Project	Fair Share %
Cypress Avenue / I-5 SB Ramps	4,039	4,900	5,076	*
Cypress Avenue / I-5 NB Ramps	4,154	4,960	5,047	*
Bonnyview Road / I-5 SB Ramps	2,651	4,050	4,321	No Mitigation Required
Bonnyview Road / I-5 NB Ramps	2,208	3,270	3,419	12%***
Churn Creek Road / Rancho Road	867	1597	1710	*
Churn Creek Road / E Niles Lane	317	424	557	No Mitigation Required
Knighton Road / Airport Road	932	1,770	1,980	No Mitigation Required
Knighton Road / Churn Creek Road	666	1,130	1,384	No Mitigation Required
Knighton Rd / Churn Creek Rd / Pacheco Rd	692	1,220	1,552	No Mitigation Required
Knighton Road / I-5 NB Ramps	786	1,270	3,615	**
Knighton Road / I-5 SB Ramps	525	710	1703	**
Knighton Road / Riverland Drive	239	320	355	No Mitigation Required
Riverside Avenue / I-5 SB Ramps	1,118	1,920	2,085	8%****
Riverside Avenue / I-5 NB Ramps	888	1,770	1,866	5%****
Knighton Rd / Project Access				To Be Constructed by Project
Churn Creek Rd / Project Access (1)				To Be Constructed by Project
Churn Creek Rd / Project Access (2)				To Be Constructed by Project
Churn Creek Rd / Project Access (3)				To Be Constructed by Project

Location	Existing	Cumulative No Project	Cumulative Plus Project	Fair Share %
Churn Creek Rd / Project Access (4)				To Be Constructed by Project

* Fair Share Calculation to be in accordance with Major Road Impact Fees Program adopted by the Board of Supervisors in June 1991 (*Resolution 91-115, A Resolution Establishing Major Road Impact Fees for the South Central Regional Area*).

** Fair Share Calculation to be in accordance with *Shasta County Ordinance 665 Public Facilities Impact Fees.*

*** Fair Share Calculation = Project Traffic/Cumulative Plus Project Traffic – Existing Traffic

**** Fair Share Calculation for these intersections are based on a revised formula (Project Traffic/Cumulative Plus Project Traffic) to account for existing unacceptable Level of Service at each location that the proposed project is not responsible for.

Source: Fehr & Peers and Quad Knopf, 2010

ROADWAY SEGMENT FAIR SHARE CALCULATIONS – AVERAGE WEEKDAY VOLUME

Location	Segment		Existing	Cumulative No Project	Cumulative Plus Project	Fair Share %
	From	To				
Knighton Road	I-5 Southbound Ramps	I-5 Northbound Ramps	5,572	7,500	14,549	*
	I-5 Northbound Ramps	Churn Creek Road	6,705	11,100	25,021	*
	Churn Creek Road	Airport Road	3,756	5,600	7,891	No Mitigation Required
Churn Creek Road	Knighton Road	E. Niles Lane	2,753	4,800	6,034	No Mitigation Required
	E. Niles Lane	Rancho Road	4,100	5,000	6,057	No Mitigation Required
	Rancho Road	I-5	15,296	17,000	17,176	No Mitigation Required

* Fair Share Calculation to be in accordance with *Shasta County Ordinance 665 Public Facilities Impact Fees.*

Source: Fehr & Peers and Quad Knopf, 2010

Traffic Model Runs (6/10/2010)
Fehr & Peers Transportation Consultants

Existing 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	0.96	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.97	1.00
Satd. Flow (prot)		4996		1770	5085					1681	1566	1504
Flt Permitted		1.00		0.95	1.00					0.95	0.97	1.00
Satd. Flow (perm)		4996		1770	5085					1681	1566	1504
Volume (vph)	0	1752	233	362	897	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	253	393	975	0	0	0	0	430	0	434
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	12	164
Lane Group Flow (vph)	0	2143	0	393	975	0	0	0	0	246	246	196
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		58.3		28.7	91.0					21.0	21.0	21.0
Effective Green, g (s)		58.3		28.7	91.0					21.0	21.0	21.0
Actuated g/C Ratio		0.49		0.24	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)		2427		423	3856					294	274	263
v/s Ratio Prot		c0.43		c0.22	0.19					0.15	c0.16	
v/s Ratio Perm												0.13
v/c Ratio		0.88		0.93	0.25					0.84	0.90	0.74
Uniform Delay, d1		27.8		44.7	4.3					47.8	48.4	47.0
Progression Factor		1.00		0.27	0.68					1.00	1.00	1.00
Incremental Delay, d2		5.1		12.3	0.1					18.3	28.9	10.9
Delay (s)		32.9		24.5	3.0					66.1	77.4	57.8
Level of Service		C		C	A					E	E	E
Approach Delay (s)		32.9			9.2			0.0			66.0	
Approach LOS		C			A			A			E	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.89	0.85			
Flt Protected	0.95	1.00			1.00		0.95	0.99	1.00			
Satd. Flow (prot)	1770	5085			4844		1681	1494	1504			
Flt Permitted	0.95	1.00			1.00		0.95	0.99	1.00			
Satd. Flow (perm)	1770	5085			4844		1681	1494	1504			
Volume (vph)	690	1458	0	0	1109	514	150	0	233	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	1205	559	163	0	253	0	0	0
RTOR Reduction (vph)	0	0	0	0	67	0	0	70	70	0	0	0
Lane Group Flow (vph)	750	1585	0	0	1697	0	117	84	75	0	0	0
Turn Type	Prot						Split		Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases									8			
Actuated Green, G (s)	50.0	99.1			45.1		12.9	12.9	12.9			
Effective Green, g (s)	50.0	99.1			45.1		12.9	12.9	12.9			
Actuated g/C Ratio	0.42	0.83			0.38		0.11	0.11	0.11			
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	4199			1821		181	161	162			
v/s Ratio Prot	c0.42	0.31			c0.35		c0.07	0.06				
v/s Ratio Perm									0.05			
v/c Ratio	1.02	0.38			0.93		0.65	0.52	0.47			
Uniform Delay, d1	35.0	2.6			36.0		51.4	50.6	50.3			
Progression Factor	0.17	0.20			1.00		1.00	1.00	1.00			
Incremental Delay, d2	26.2	0.1			10.2		7.7	3.1	2.1			
Delay (s)	32.1	0.7			46.1		59.1	53.7	52.4			
Level of Service	C	A			D		E	D	D			
Approach Delay (s)		10.8			46.1			54.8			0.0	
Approach LOS		B			D			D			A	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	349	185	615	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	379	201	668	0	0	0	0	159	0	461
RTOR Reduction (vph)	0	0	230	0	0	0	0	0	0	0	0	201
Lane Group Flow (vph)	0	1013	149	201	668	0	0	0	0	159	0	260
Turn Type			Perm	Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases			2							4		4
Actuated Green, G (s)		25.5	25.5	13.5	43.0					14.0		14.0
Effective Green, g (s)		25.5	25.5	13.5	43.0					14.0		14.0
Actuated g/C Ratio		0.39	0.39	0.21	0.66					0.22		0.22
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)		1995	621	368	2341					381		341
v/s Ratio Prot		c0.20		c0.11	0.19							
v/s Ratio Perm			0.09							0.09		c0.16
v/c Ratio		0.51	0.24	0.55	0.29					0.42		0.76
Uniform Delay, d1		15.0	13.2	23.0	4.6					22.0		23.9
Progression Factor		1.00	1.00	0.20	0.39					1.00		1.00
Incremental Delay, d2		0.9	0.9	1.4	0.2					0.7		9.7
Delay (s)		15.9	14.2	6.0	2.0					22.7		33.7
Level of Service		B	B	A	A					C		C
Approach Delay (s)		15.4			2.9			0.0			30.9	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	571	144	229	0	186	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	621	157	249	0	202	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	110	0	0	161	0	0	0
Lane Group Flow (vph)	514	658	0	0	621	47	249	0	41	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	5	2			6							
Permitted Phases						6	8		8			
Actuated Green, G (s)	20.4	43.7			19.3	19.3	13.3		13.3			
Effective Green, g (s)	20.4	43.7			19.3	19.3	13.3		13.3			
Actuated g/C Ratio	0.31	0.67			0.30	0.30	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)	556	2379			1051	470	362		324			
v/s Ratio Prot	c0.29	0.19			c0.18							
v/s Ratio Perm						0.03	c0.14		0.03			
v/c Ratio	0.92	0.28			0.59	0.10	0.69		0.13			
Uniform Delay, d1	21.6	4.3			19.5	16.6	23.9		21.1			
Progression Factor	0.30	0.23			1.00	1.00	1.00		1.00			
Incremental Delay, d2	19.3	0.3			2.4	0.4	5.4		0.2			
Delay (s)	25.8	1.2			21.9	17.0	29.3		21.3			
Level of Service	C	A			C	B	C		C			
Approach Delay (s)		12.0			20.9			25.7			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	274	142	144	16	22	200
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	298	154	157	17	24	217
Pedestrians			100			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			8			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	174				1015	165
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	174				1015	165
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	79				87	75
cM capacity (veh/h)	1403				191	879

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	298	154	174	241
Volume Left	298	0	0	24
Volume Right	0	0	17	217
cSH	1403	1700	1700	647
Volume to Capacity	0.21	0.09	0.10	0.37
Queue Length 95th (ft)	20	0	0	43
Control Delay (s)	8.3	0.0	0.0	13.8
Lane LOS	A			B
Approach Delay (s)	5.4		0.0	13.8
Approach LOS				B

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	47.3%	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)	8	6	7	125	132	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	7	8	136	143	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	302	151	159			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	302	151	159			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	99			
cM capacity (veh/h)	686	895	1421			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	15	143	159
Volume Left	9	8	0
Volume Right	7	0	15
cSH	762	1421	1700
Volume to Capacity	0.02	0.01	0.09
Queue Length 95th (ft)	2	0	0
Control Delay (s)	9.8	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.8	0.4	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	22.3%	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)	53	31	96	13	11	16	40	175	16	49	384	48
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)	58	34	104	14	12	17	43	190	17	53	417	52
RTOR Reduction (vph)	0	0	85	0	0	14	0	0	8	0	0	23
Lane Group Flow (vph)	58	34	19	14	12	3	43	190	9	53	417	29
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)	10.2	10.2	10.2	10.2	10.2	10.2	2.0	29.9	29.9	2.5	30.4	30.4
Effective Green, g (s)	10.2	10.2	10.2	10.2	10.2	10.2	2.0	29.9	29.9	2.5	30.4	30.4
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.04	0.55	0.55	0.05	0.56	0.56
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)	261	348	296	256	348	296	65	1020	867	81	1037	881
v/s Ratio Prot		0.02			0.01		0.02	0.10		c0.03	c0.22	
v/s Ratio Perm	c0.04		0.01	0.01		0.00			0.01			0.02
v/c Ratio	0.22	0.10	0.07	0.05	0.03	0.01	0.66	0.19	0.01	0.65	0.40	0.03
Uniform Delay, d1	18.8	18.4	18.3	18.2	18.2	18.1	26.0	6.2	5.6	25.6	6.9	5.5
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	0.4	0.1	0.1	0.1	0.0	0.0	22.5	0.1	0.0	17.4	0.3	0.0
Delay (s)	19.3	18.5	18.4	18.3	18.2	18.1	48.4	6.3	5.6	43.0	7.2	5.5
Level of Service	B	B	B	B	B	B	D	A	A	D	A	A
Approach Delay (s)		18.7			18.2			13.5			10.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	54.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.1%	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	0.59	1.00	0.95	
Satd. Flow (perm)	1863	1583	1099	1863	1769	
Volume (vph)	254	144	8	157	103	4
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	276	157	9	171	112	4
RTOR Reduction (vph)	0	50	0	0	3	0
Lane Group Flow (vph)	276	107	9	171	113	0
Turn Type		Perm	Perm			
Protected Phases	4			8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	37.8	37.8	37.8	37.8	9.6	
Effective Green, g (s)	37.8	37.8	37.8	37.8	9.6	
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.17	
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)	1271	1080	750	1271	307	
v/s Ratio Prot	c0.15			0.09	c0.06	
v/s Ratio Perm		0.07	0.01			
v/c Ratio	0.22	0.10	0.01	0.13	0.37	
Uniform Delay, d1	3.3	3.0	2.8	3.1	20.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.0	0.0	0.0	0.7	
Delay (s)	3.4	3.0	2.8	3.1	21.0	
Level of Service	A	A	A	A	C	
Approach Delay (s)	3.2			3.1	21.0	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	55.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	26.0%	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		0.98			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	1845	1615	1805	1863	1583		1852			1786	1583
Flt Permitted	0.95	1.00	1.00	0.63	1.00	1.00		0.94			0.72	1.00
Satd. Flow (perm)	1770	1845	1615	1190	1863	1583		1761			1349	1583
Volume (vph)	72	193	1	4	214	38	6	22	4	73	8	57
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)	78	210	1	4	233	41	7	24	4	79	9	62
RTOR Reduction (vph)	0	0	0	0	0	18	0	3	0	0	0	52
Lane Group Flow (vph)	78	210	1	4	233	23	0	32	0	0	88	10
Heavy Vehicles (%)	2%	3%	0%	0%	2%	2%	0%	0%	0%	2%	0%	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)	2.9	37.2	37.2	30.3	30.3	30.3		9.0			9.0	9.0
Effective Green, g (s)	2.9	37.2	37.2	30.3	30.3	30.3		9.0			9.0	9.0
Actuated g/C Ratio	0.05	0.69	0.69	0.56	0.56	0.56		0.17			0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			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)	95	1266	1108	665	1041	885		292			224	263
v/s Ratio Prot	c0.04	0.11			c0.13							
v/s Ratio Perm			0.00	0.00		0.01		0.02			c0.07	0.01
v/c Ratio	0.82	0.17	0.00	0.01	0.22	0.03		0.11			0.39	0.04
Uniform Delay, d1	25.4	3.0	2.7	5.3	6.0	5.3		19.2			20.2	19.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	41.0	0.1	0.0	0.0	0.1	0.0		0.2			1.1	0.1
Delay (s)	66.4	3.1	2.7	5.3	6.1	5.4		19.4			21.3	19.0
Level of Service	E	A	A	A	A	A		B			C	B
Approach Delay (s)		20.2			6.0			19.4			20.4	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	54.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.4%	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												
Sign Control		Free			Free			Stop			Stop	
Grade		-4%			4%			0%			0%	
Volume (veh/h)	49	185	0	0	157	198	33	0	164	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	201	0	0	171	215	36	0	178	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					739							
pX, platoon unblocked												
vC, conflicting volume	386			201			586	693	201	764	586	278
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	386			201			586	693	201	764	586	278
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			91	100	79	100	100	100
cM capacity (veh/h)	1173			1383			407	350	837	245	406	765

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	254	386	214
Volume Left	53	0	36
Volume Right	0	215	178
cSH	1173	1700	711
Volume to Capacity	0.05	0.23	0.30
Queue Length 95th (ft)	4	0	32
Control Delay (s)	2.1	0.0	12.2
Lane LOS	A		B
Approach Delay (s)	2.1	0.0	12.2
Approach LOS			B

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			-4%			0%			0%	
Volume (veh/h)	0	68	25	120	70	0	0	0	0	166	0	76
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	74	27	130	76	0	0	0	0	180	0	83
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	76			101			507	424	88	424	438	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	76			101			507	424	88	424	438	76
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.5	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.9	4.0	3.3
p0 queue free %	100			91			100	100	100	60	100	92
cM capacity (veh/h)	1536			1498			410	479	976	449	471	985

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	101	207	263
Volume Left	0	130	180
Volume Right	27	0	83
cSH	1700	1498	541
Volume to Capacity	0.06	0.09	0.49
Queue Length 95th (ft)	0	7	66
Control Delay (s)	0.0	5.1	17.8
Lane LOS		A	C
Approach Delay (s)	0.0	5.1	17.8
Approach LOS			C

Intersection Summary			
Average Delay	10.0		
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	14	0	119	22	5	0	0	71	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	15	0	129	24	5	0	0	77	9	0	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	15	159	77	9
Volume Left (vph)	0	129	0	9
Volume Right (vph)	0	5	77	0
Hadj (s)	0.03	0.18	-0.57	0.22
Departure Headway (s)	4.3	4.3	3.7	4.6
Degree Utilization, x	0.02	0.19	0.08	0.01
Capacity (veh/h)	815	826	914	739
Control Delay (s)	7.4	8.3	7.1	7.6
Approach Delay (s)	7.4	8.3	7.1	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
HCM Level of Service	A		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	343	173	99	213	0	0	0	0	113	0	177
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	373	188	108	232	0	0	0	0	123	0	192
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												6
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	232			373			914	914	467	914	820	232
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	232			373			914	914	467	914	820	232
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			91			100	100	100	48	100	76
cM capacity (veh/h)	1336			1186			180	248	596	236	282	808

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	561	108	232	315
Volume Left	0	108	0	123
Volume Right	188	0	0	192
cSH	1700	1186	1700	607
Volume to Capacity	0.33	0.09	0.14	0.52
Queue Length 95th (ft)	0	7	0	75
Control Delay (s)	0.0	8.3	0.0	20.5
Lane LOS		A		C
Approach Delay (s)	0.0	2.6		20.5
Approach LOS				C

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	273	183	73	178	134	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	297	199	79	193	146	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						6
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			297		649	297
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			297		649	297
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		64	93
cM capacity (veh/h)			1265		407	743

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	297	199	79	193	197
Volume Left	0	0	79	0	146
Volume Right	0	199	0	0	51
cSH	1700	1700	1265	1700	550
Volume to Capacity	0.17	0.12	0.06	0.11	0.36
Queue Length 95th (ft)	0	0	5	0	40
Control Delay (s)	0.0	0.0	8.0	0.0	16.5
Lane LOS			A		C
Approach Delay (s)	0.0		2.3		16.5
Approach LOS					C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: Cypress Avenue & SB Ramps

6/10/2010

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		0.99		1.00	1.00					1.00	0.97	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.96	1.00
Satd. Flow (prot)		5037		1770	5085					1681	1584	1504
Flt Permitted		1.00		0.95	1.00					0.95	0.96	1.00
Satd. Flow (perm)		5037		1770	5085					1681	1584	1504
Volume (vph)	0	1630	110	120	1080	0	0	0	0	360	0	240
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	1772	120	130	1174	0	0	0	0	391	0	261
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	14	64
Lane Group Flow (vph)	0	1881	0	130	1174	0	0	0	0	209	209	156
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		29.7		5.6	39.3					12.7	12.7	12.7
Effective Green, g (s)		29.7		5.6	39.3					12.7	12.7	12.7
Actuated g/C Ratio		0.49		0.09	0.65					0.21	0.21	0.21
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)		2493		165	3331					356	335	318
v/s Ratio Prot		c0.37		c0.07	0.23					0.12	c0.13	
v/s Ratio Perm												0.10
v/c Ratio		0.75		0.79	0.35					0.59	0.62	0.49
Uniform Delay, d1		12.2		26.6	4.6					21.3	21.5	20.8
Progression Factor		1.00		1.32	0.75					1.00	1.00	1.00
Incremental Delay, d2		2.2		13.3	0.2					2.5	3.6	1.2
Delay (s)		14.4		48.5	3.6					23.8	25.1	22.0
Level of Service		B		D	A					C	C	C
Approach Delay (s)		14.4			8.1			0.0			23.6	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	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			0.96		1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00		0.95	0.95	1.00			
Satd. Flow (prot)	1770	5085			4860		1681	1610	1504			
Flt Permitted	0.95	1.00			1.00		0.95	0.95	1.00			
Satd. Flow (perm)	1770	5085			4860		1681	1610	1504			
Volume (vph)	910	1080	0	0	1100	460	100	0	20	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)	989	1174	0	0	1196	500	109	0	22	0	0	0
RTOR Reduction (vph)	0	0	0	0	57	0	0	0	20	0	0	0
Lane Group Flow (vph)	989	1174	0	0	1639	0	55	54	2	0	0	0
Turn Type	Prot						Split		Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases									8			
Actuated Green, G (s)	50.0	103.8			49.8		8.2	8.2	8.2			
Effective Green, g (s)	50.0	103.8			49.8		8.2	8.2	8.2			
Actuated g/C Ratio	0.42	0.86			0.41		0.07	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)	738	4399			2017		115	110	103			
v/s Ratio Prot	c0.56	0.23			c0.34		0.03	c0.03				
v/s Ratio Perm									0.00			
v/c Ratio	1.34	0.27			0.81		0.48	0.49	0.01			
Uniform Delay, d1	35.0	1.4			31.0		53.8	53.9	52.1			
Progression Factor	0.66	1.33			1.00		1.00	1.00	1.00			
Incremental Delay, d2	159.1	0.1			3.7		3.1	3.4	0.1			
Delay (s)	182.3	2.0			34.7		57.0	57.3	52.2			
Level of Service	F	A			C		E	E	D			
Approach Delay (s)		84.5			34.7			56.3			0.0	
Approach LOS		F			C			E			A	

Intersection Summary			
HCM Average Control Delay	62.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	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	710	188	157	481	0	0	0	0	98	0	377
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	772	204	171	523	0	0	0	0	107	0	410
RTOR Reduction (vph)	0	0	109	0	0	0	0	0	0	0	0	295
Lane Group Flow (vph)	0	772	95	171	523	0	0	0	0	107	0	115
Turn Type			Perm	Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases			2							4		4
Actuated Green, G (s)		30.3	30.3	12.1	46.4					10.6		10.6
Effective Green, g (s)		30.3	30.3	12.1	46.4					10.6		10.6
Actuated g/C Ratio		0.47	0.47	0.19	0.71					0.16		0.16
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		2370	738	329	2526					289		258
v/s Ratio Prot		c0.15		c0.10	0.15							
v/s Ratio Perm			0.06							0.06		c0.07
v/c Ratio		0.33	0.13	0.52	0.21					0.37		0.44
Uniform Delay, d1		10.9	9.9	23.8	3.1					24.2		24.5
Progression Factor		1.00	1.00	0.25	0.45					1.00		1.00
Incremental Delay, d2		0.4	0.4	1.3	0.2					0.8		1.2
Delay (s)		11.3	10.2	7.2	1.6					25.0		25.8
Level of Service		B	B	A	A					C		C
Approach Delay (s)		11.1			3.0			0.0			25.6	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.4%	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												
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)	375	433	0	0	458	116	180	0	179	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)	408	471	0	0	498	126	196	0	195	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	82	0	0	159	0	0	0
Lane Group Flow (vph)	408	471	0	0	498	44	196	0	36	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	5	2			6							
Permitted Phases						6	8		8			
Actuated Green, G (s)	18.1	45.0			22.9	22.9	12.0		12.0			
Effective Green, g (s)	18.1	45.0			22.9	22.9	12.0		12.0			
Actuated g/C Ratio	0.28	0.69			0.35	0.35	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)	493	2450			1247	558	327		292			
v/s Ratio Prot	c0.23	0.13			c0.14							
v/s Ratio Perm						0.03	c0.11		0.02			
v/c Ratio	0.83	0.19			0.40	0.08	0.60		0.12			
Uniform Delay, d1	22.0	3.5			15.9	14.0	24.3		22.1			
Progression Factor	0.39	0.33			1.00	1.00	1.00		1.00			
Incremental Delay, d2	10.6	0.2			1.0	0.3	2.9		0.2			
Delay (s)	19.1	1.3			16.8	14.3	27.2		22.3			
Level of Service	B	A			B	B	C		C			
Approach Delay (s)		9.6			16.3			24.8			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	182	142	140	5	13	201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	198	154	152	5	14	218
Pedestrians			100			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			8			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	158				805	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	158				805	155
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	86				95	75
cM capacity (veh/h)	1422				278	891

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	198	154	158	233
Volume Left	198	0	0	14
Volume Right	0	0	5	218
cSH	1422	1700	1700	785
Volume to Capacity	0.14	0.09	0.09	0.30
Queue Length 95th (ft)	12	0	0	31
Control Delay (s)	7.9	0.0	0.0	11.5
Lane LOS	A			B
Approach Delay (s)	4.5		0.0	11.5
Approach LOS				B

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	40.9%	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	7	8	84	88	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	8	9	91	96	11
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	210	101	107			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	210	101	107			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	99			
cM capacity (veh/h)	774	954	1484			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	17	100	107
Volume Left	10	9	0
Volume Right	8	0	11
cSH	844	1484	1700
Volume to Capacity	0.02	0.01	0.06
Queue Length 95th (ft)	2	0	0
Control Delay (s)	9.4	0.7	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	0.7	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	21.1%	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	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1393	1863	1583	1389	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	29	17	73	13	14	18	50	286	19	31	328	29
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)	32	18	79	14	15	20	54	311	21	34	357	32
RTOR Reduction (vph)	0	0	68	0	0	17	0	0	8	0	0	12
Lane Group Flow (vph)	32	18	11	14	15	3	54	311	13	34	357	20
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)	8.2	8.2	8.2	8.2	8.2	8.2	2.6	37.3	37.3	1.1	35.8	35.8
Effective Green, g (s)	8.2	8.2	8.2	8.2	8.2	8.2	2.6	37.3	37.3	1.1	35.8	35.8
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.04	0.64	0.64	0.02	0.61	0.61
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)	195	261	222	194	261	222	79	1186	1008	33	1138	967
v/s Ratio Prot		0.01			0.01		c0.03	0.17		0.02	c0.19	
v/s Ratio Perm	c0.02		0.01	0.01		0.00			0.01			0.01
v/c Ratio	0.16	0.07	0.05	0.07	0.06	0.01	0.68	0.26	0.01	1.03	0.31	0.02
Uniform Delay, d1	22.2	21.9	21.8	21.9	21.8	21.7	27.6	4.6	3.9	28.8	5.5	4.5
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	0.4	0.1	0.1	0.2	0.1	0.0	21.7	0.1	0.0	166.0	0.2	0.0
Delay (s)	22.6	22.0	21.9	22.1	21.9	21.7	49.3	4.8	3.9	194.7	5.6	4.5
Level of Service	C	C	C	C	C	C	D	A	A	F	A	A
Approach Delay (s)		22.1			21.9			10.9			20.8	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.9%	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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	1.00	1.00	0.95	1.00	0.96	
Satd. Flow (prot)	1863	1583	1770	1863	1764	
Flt Permitted	1.00	1.00	0.68	1.00	0.96	
Satd. Flow (perm)	1863	1583	1263	1863	1764	
Volume (vph)	113	98	6	97	131	9
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	107	7	105	142	10
RTOR Reduction (vph)	0	43	0	0	8	0
Lane Group Flow (vph)	123	64	7	105	144	0
Turn Type		Perm	Perm			
Protected Phases	4			8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	29.6	29.6	29.6	29.6	12.0	
Effective Green, g (s)	29.6	29.6	29.6	29.6	12.0	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1112	945	754	1112	427	
v/s Ratio Prot	c0.07			0.06	c0.08	
v/s Ratio Perm		0.04	0.01			
v/c Ratio	0.11	0.07	0.01	0.09	0.34	
Uniform Delay, d1	4.3	4.2	4.1	4.3	15.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0	0.0	0.0	0.5	
Delay (s)	4.4	4.2	4.1	4.3	16.0	
Level of Service	A	A	A	A	B	
Approach Delay (s)	4.3			4.3	16.0	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	20.4%	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												
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		1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96			0.95	1.00
Satd. Flow (prot)	1770	1845	1615	1805	1863	1583		1831			1778	1583
Flt Permitted	0.95	1.00	1.00	0.65	1.00	1.00		0.86			0.74	1.00
Satd. Flow (perm)	1770	1845	1615	1242	1863	1583		1634			1373	1583
Volume (vph)	26	150	4	1	221	15	3	1	0	50	2	36
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)	28	163	4	1	240	16	3	1	0	54	2	39
RTOR Reduction (vph)	0	0	1	0	0	6	0	0	0	0	0	33
Lane Group Flow (vph)	28	163	3	1	240	10	0	4	0	0	56	6
Heavy Vehicles (%)	2%	3%	0%	0%	2%	2%	0%	0%	0%	2%	0%	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)	1.1	44.5	44.5	39.4	39.4	39.4		9.5			9.5	9.5
Effective Green, g (s)	1.1	44.5	44.5	39.4	39.4	39.4		9.5			9.5	9.5
Actuated g/C Ratio	0.02	0.72	0.72	0.64	0.64	0.64		0.15			0.15	0.15
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)	31	1324	1159	789	1184	1006		250			210	243
v/s Ratio Prot	c0.02	0.09			c0.13							
v/s Ratio Perm			0.00	0.00		0.01		0.00			c0.04	0.00
v/c Ratio	0.90	0.12	0.00	0.00	0.20	0.01		0.02			0.27	0.02
Uniform Delay, d1	30.4	2.7	2.5	4.1	4.7	4.1		22.3			23.2	22.3
Progression Factor	1.00	1.01	1.03	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	120.7	0.0	0.0	0.0	0.1	0.0		0.0			0.7	0.0
Delay (s)	151.1	2.8	2.6	4.1	4.8	4.1		22.3			23.9	22.4
Level of Service	F	A	A	A	A	A		C			C	C
Approach Delay (s)		24.1			4.8			22.3			23.2	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	28.4%	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												
Sign Control		Free			Free			Stop			Stop	
Grade		-4%			4%			0%			0%	
Volume (veh/h)	76	137	0	0	101	177	22	0	11	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	83	149	0	0	110	192	24	0	12	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					739							
pX, platoon unblocked												
vC, conflicting volume	302			149			520	616	149	532	520	206
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	302			149			520	616	149	532	520	206
tC, single (s)	4.1			4.1			7.1	6.5	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	93			100			95	100	99	100	100	100
cM capacity (veh/h)	1259			1445			443	379	857	432	433	840

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	232	302	36
Volume Left	83	0	24
Volume Right	0	192	12
cSH	1259	1700	528
Volume to Capacity	0.07	0.18	0.07
Queue Length 95th (ft)	5	0	5
Control Delay (s)	3.2	0.0	12.3
Lane LOS	A		B
Approach Delay (s)	3.2	0.0	12.3
Approach LOS			B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			-4%			0%			0%	
Volume (veh/h)	0	63	11	39	84	0	0	0	0	150	0	44
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	68	12	42	91	0	0	0	0	163	0	48
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	91			80			298	251	74	251	257	91
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	91			80			298	251	74	251	257	91
tC, single (s)	4.1			4.6			7.1	6.5	6.2	7.3	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.6			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			97			100	100	100	75	100	95
cM capacity (veh/h)	1516			1280			610	634	993	658	629	966

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	80	134	211
Volume Left	0	42	163
Volume Right	12	0	48
cSH	1700	1280	709
Volume to Capacity	0.05	0.03	0.30
Queue Length 95th (ft)	0	3	31
Control Delay (s)	0.0	2.7	12.2
Lane LOS		A	B
Approach Delay (s)	0.0	2.7	12.2
Approach LOS			B

Intersection Summary			
Average Delay		6.9	
Intersection Capacity Utilization		30.9%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	9	0	94	30	4	0	0	63	2	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	10	0	102	33	4	0	0	68	2	0	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	10	139	68	2
Volume Left (vph)	0	102	0	2
Volume Right (vph)	0	4	68	0
Hadj (s)	0.03	0.16	-0.57	0.22
Departure Headway (s)	4.2	4.2	3.7	4.5
Degree Utilization, x	0.01	0.16	0.07	0.00
Capacity (veh/h)	830	839	935	765
Control Delay (s)	7.3	8.0	6.9	7.5
Approach Delay (s)	7.3	8.0	6.9	7.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.6		
HCM Level of Service	A		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	390	80	40	260	0	0	0	0	110	0	110
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	424	87	43	283	0	0	0	0	120	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												6
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	283			424			837	837	467	837	793	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	283			424			837	837	467	837	793	283
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	100	57	100	84
cM capacity (veh/h)	1280			1135			234	291	596	278	309	756

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	511	43	283	239
Volume Left	0	43	0	120
Volume Right	87	0	0	120
cSH	1700	1135	1700	556
Volume to Capacity	0.30	0.04	0.17	0.43
Queue Length 95th (ft)	0	3	0	54
Control Delay (s)	0.0	8.3	0.0	19.0
Lane LOS		A		C
Approach Delay (s)	0.0	1.1		19.0
Approach LOS				C

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	210	290	70	210	90	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	228	315	76	228	98	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						6
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			228		609	228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			228		609	228
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		77	99
cM capacity (veh/h)			1340		432	811

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	228	315	76	228	109
Volume Left	0	0	76	0	98
Volume Right	0	315	0	0	11
cSH	1700	1700	1340	1700	481
Volume to Capacity	0.13	0.19	0.06	0.13	0.23
Queue Length 95th (ft)	0	0	5	0	22
Control Delay (s)	0.0	0.0	7.8	0.0	15.1
Lane LOS			A		C
Approach Delay (s)	0.0		2.0		15.1
Approach LOS					C

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

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

Jurisdiction: CalTrans
Analysis Year:
Analyst: Fehr & Peers

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	17	18	19
General Information	**Existing No Project**			*Flow Rate Calculation*												
	Freeway/ Direction	From/To	Analysis Time Period	Volume (vph)	PHF	Lanes	HOV Lane?	HOV Lane Volume	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}
1013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	PM	1,986	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1011	I-5 NB	Riverside Avenue / Knighton Road	PM	2,061	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1009	I-5 NB	Knighton Road / S Bonneview Road	PM	2,111	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1007	I-5 NB	Bonnyview Road / Cypress Avenue	PM	2,313	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1005	I-5 NB	Cypress Avenue / CA Highway 44	PM	3,134	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1006	I-5 SB	CA Highway 44 / Cypress Avenue	PM	2,739	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1008	I-5 SB	Cypress Avenue / Bonnyview Road	PM	2,539	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1010	I-5 SB	S Bonneview Road / Knighton Road	PM	2,503	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1012	I-5 SB	Knighton Road / Riverside Avenue	PM	2,406	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
1014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	PM	2,388	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	Saturday	1,987	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2011	I-5 NB	Riverside Avenue / Knighton Road	Saturday	2,247	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2009	I-5 NB	Knighton Road / S Bonneview Road	Saturday	2,467	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2007	I-5 NB	Bonnyview Road / Cypress Avenue	Saturday	2,599	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2005	I-5 NB	Cypress Avenue / CA Highway 44	Saturday	3,849	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2006	I-5 SB	CA Highway 44 / Cypress Avenue	Saturday	2,092	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2008	I-5 SB	Cypress Avenue / Bonnyview Road	Saturday	1,722	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2010	I-5 SB	S Bonneview Road / Knighton Road	Saturday	1,592	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2012	I-5 SB	Knighton Road / Riverside Avenue	Saturday	1,448	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95
2014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	Saturday	1,348	0.92	2	No		Level			10.0%	0.0%	1.5	1.2	0.95

HCM 2000 Basic Freeway Segm Capacity Analysis | **HCM 2000 Basic Freeway Segments Capacity Analysis**

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General Information **Existing No Project**

	Freeway/ Direction	From/To	Analysis Time Period	f_P	Flow Rate v_p (pcphpl)
1013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	PM	1.00	1,133
1011	I-5 NB	Riverside Avenue / Knighton Road	PM	1.00	1,176
1009	I-5 NB	Knighton Road / S Bonneview Road	PM	1.00	1,205
1007	I-5 NB	Bonnyview Road / Cypress Avenue	PM	1.00	1,320
1005	I-5 NB	Cypress Avenue / CA Highway 44	PM	1.00	1,788
1006	I-5 SB	CA Highway 44 / Cypress Avenue	PM	1.00	1,563
1008	I-5 SB	Cypress Avenue / Bonnyview Road	PM	1.00	1,449
1010	I-5 SB	S Bonneview Road / Knighton Road	PM	1.00	1,428
1012	I-5 SB	Knighton Road / Riverside Avenue	PM	1.00	1,373
1014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	PM	1.00	1,363
2013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	Saturday	1.00	1,134
2011	I-5 NB	Riverside Avenue / Knighton Road	Saturday	1.00	1,282
2009	I-5 NB	Knighton Road / S Bonneview Road	Saturday	1.00	1,408
2007	I-5 NB	Bonnyview Road / Cypress Avenue	Saturday	1.00	1,483
2005	I-5 NB	Cypress Avenue / CA Highway 44	Saturday	1.00	2,196
2006	I-5 SB	CA Highway 44 / Cypress Avenue	Saturday	1.00	1,194
2008	I-5 SB	Cypress Avenue / Bonnyview Road	Saturday	1.00	983
2010	I-5 SB	S Bonneview Road / Knighton Road	Saturday	1.00	908
2012	I-5 SB	Knighton Road / Riverside Avenue	Saturday	1.00	826
2014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	Saturday	1.00	769

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

1 2 3 4 22

General Information **Existing No Project** *Speed Calculation* *Results*

	Freeway/ Direction	From/To	Analysis Time Period	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)	Density, D (pcplpm)
1013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	PM										65.0	65.0	65.0	**17.4**
1011	I-5 NB	Riverside Avenue / Knighton Road	PM										65.0	65.0	65.0	**18.1**
1009	I-5 NB	Knighton Road / S Bonneview Road	PM										65.0	65.0	65.0	**18.5**
1007	I-5 NB	Bonnyview Road / Cypress Avenue	PM										65.0	65.0	65.0	**20.3**
1005	I-5 NB	Cypress Avenue / CA Highway 44	PM										65.0	65.0	64.0	**27.9**
1006	I-5 SB	CA Highway 44 / Cypress Avenue	PM										65.0	65.0	64.9	**24.1**
1008	I-5 SB	Cypress Avenue / Bonnyview Road	PM										65.0	65.0	65.0	**22.3**
1010	I-5 SB	S Bonneview Road / Knighton Road	PM										65.0	65.0	65.0	**22.0**
1012	I-5 SB	Knighton Road / Riverside Avenue	PM										65.0	65.0	65.0	**21.1**
1014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	PM										65.0	65.0	65.0	**21.0**
2013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	Saturday										65.0	65.0	65.0	**17.4**
2011	I-5 NB	Riverside Avenue / Knighton Road	Saturday										65.0	65.0	65.0	**19.7**
2009	I-5 NB	Knighton Road / S Bonneview Road	Saturday										65.0	65.0	65.0	**21.7**
2007	I-5 NB	Bonnyview Road / Cypress Avenue	Saturday										65.0	65.0	65.0	**22.8**
2005	I-5 NB	Cypress Avenue / CA Highway 44	Saturday										65.0	65.0	57.1	**38.4**
2006	I-5 SB	CA Highway 44 / Cypress Avenue	Saturday										65.0	65.0	65.0	**18.4**
2008	I-5 SB	Cypress Avenue / Bonnyview Road	Saturday										65.0	65.0	65.0	**15.1**
2010	I-5 SB	S Bonneview Road / Knighton Road	Saturday										65.0	65.0	65.0	**14.0**
2012	I-5 SB	Knighton Road / Riverside Avenue	Saturday										65.0	65.0	65.0	**12.7**
2014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	Saturday										65.0	65.0	65.0	**11.8**

HCM 2000 Basic Freeway Segm Capacity Analysis | **HCM 2000 Basic Freeway Segments Capacity Analysis**

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General Information **Existing No Project**

	Freeway/ Direction	From/To	Analysis Time Period	Level of Service
1013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	PM	B
1011	I-5 NB	Riverside Avenue / Knighton Road	PM	C
1009	I-5 NB	Knighton Road / S Bonneview Road	PM	C
1007	I-5 NB	Bonnyview Road / Cypress Avenue	PM	C
1005	I-5 NB	Cypress Avenue / CA Highway 44	PM	D
1006	I-5 SB	CA Highway 44 / Cypress Avenue	PM	C
1008	I-5 SB	Cypress Avenue / Bonnyview Road	PM	C
1010	I-5 SB	S Bonneview Road / Knighton Road	PM	C
1012	I-5 SB	Knighton Road / Riverside Avenue	PM	C
1014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	PM	C
2013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	Saturday	B
2011	I-5 NB	Riverside Avenue / Knighton Road	Saturday	C
2009	I-5 NB	Knighton Road / S Bonneview Road	Saturday	C
2007	I-5 NB	Bonnyview Road / Cypress Avenue	Saturday	C
2005	I-5 NB	Cypress Avenue / CA Highway 44	Saturday	E
2006	I-5 SB	CA Highway 44 / Cypress Avenue	Saturday	C
2008	I-5 SB	Cypress Avenue / Bonnyview Road	Saturday	B
2010	I-5 SB	S Bonneview Road / Knighton Road	Saturday	B
2012	I-5 SB	Knighton Road / Riverside Avenue	Saturday	B
2014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	Saturday	B

HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge 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 No Project**

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)
1013	I-5 NB	Riverside Avenue	PM	2	0	1,805	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,060
1011	I-5 NB	Knighton Road	PM	2	0	1,864	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,127
1009	I-5 NB	Bonnyview Road	PM	2	0	1,696	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	1,936
1007	I-5 NB	Cypress Avenue	PM	2	0	1,930	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,203
1006	I-5 SB	Cypress Avenue	PM	2	0	1,944	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,219
1008	I-5 SB	Bonnyview Road	PM	2	0	1,969	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,247
1010	I-5 SB	Knighton Road	PM	2	0	2,261	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,580
1012	I-5 SB	Riverside Avenue	PM	2	0	2,116	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,415
2013	I-5 NB	Riverside Avenue	Saturday	2	0	1,887	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,154
2011	I-5 NB	Knighton Road	Saturday	2	0	2,214	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,527
2009	I-5 NB	Bonnyview Road	Saturday	2	0	2,108	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,406
2007	I-5 NB	Cypress Avenue	Saturday	2	0	2,479	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,829
2006	I-5 SB	Cypress Avenue	Saturday	2	0	1,492	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	1,703
2008	I-5 SB	Bonnyview Road	Saturday	2	0	1,247	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	1,423
2010	I-5 SB	Knighton Road	Saturday	2	0	1,398	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	1,596
2012	I-5 SB	Riverside Avenue	Saturday	2	0	1,228	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	1,402

General Information **Existing No Project** *On-Ramp Data* *On-Ramp Volume Adjustment*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Type	Lanes	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	Right	1	35.0	256	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	292
1011	I-5 NB	Knighton Road	PM	Right	1	35.0	247	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	282
1009	I-5 NB	Bonnyview Road	PM	Right	1	35.0	617	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	704
1007	I-5 NB	Cypress Avenue	PM	Right	1	35.0	1,204	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,374
1006	I-5 SB	Cypress Avenue	PM	Right	1	35.0	595	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	679
1008	I-5 SB	Bonnyview Road	PM	Right	1	35.0	534	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	609
1010	I-5 SB	Knighton Road	PM	Right	1	35.0	145	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	165
1012	I-5 SB	Riverside Avenue	PM	Right	1	35.0	272	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	310
2013	I-5 NB	Riverside Avenue	Saturday	Right	1	35.0	360	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	411
2011	I-5 NB	Knighton Road	Saturday	Right	1	35.0	253	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	289
2009	I-5 NB	Bonnyview Road	Saturday	Right	1	35.0	491	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	560
2007	I-5 NB	Cypress Avenue	Saturday	Right	1	35.0	1,370	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,564
2006	I-5 SB	Cypress Avenue	Saturday	Right	1	35.0	230	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	263
2008	I-5 SB	Bonnyview Road	Saturday	Right	1	35.0	345	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	394
2010	I-5 SB	Knighton Road	Saturday	Right	1	35.0	50	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	57
2012	I-5 SB	Riverside Avenue	Saturday	Right	1	35.0	120	100	0	100	0.92	Level			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 Analyst

General Information **Existing No 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	197	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	225
1009	I-5 NB	Bonnyview Road	PM	Off	1,450	415	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	474
1007	I-5 NB	Cypress Avenue	PM	Off	1,650	383	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	437
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	242	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	276
1012	I-5 SB	Riverside Avenue	PM	Off	1,150	290	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	331
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	33	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	38
2009	I-5 NB	Bonnyview Road	Saturday	Off	1,450	359	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	410
2007	I-5 NB	Cypress Avenue	Saturday	Off	1,650	120	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	137
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	194	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	221
2012	I-5 SB	Riverside Avenue	Saturday	Off	1,150	220	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	251
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HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge Ramp Junctions Capacity Analysis** | Juri Analy

General Information **Existing No Project** | *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	2	3
1013	I-5 NB	Riverside Avenue	PM	No														-24	9,487	0.580	0.732	
1011	I-5 NB	Knighton Road	PM	No														-12	9,487	0.580	0.781	
1009	I-5 NB	Bonnyview Road	PM	No														38	9,487	0.580	0.781	
1007	I-5 NB	Cypress Avenue	PM	No														238	9,487	0.580	0.781	
1006	I-5 SB	Cypress Avenue	PM	No														93	9,487	0.580	0.790	
1008	I-5 SB	Bonnyview Road	PM	No														84	9,487	0.580	0.778	
1010	I-5 SB	Knighton Road	PM	No														60	9,487	0.580	0.777	
1012	I-5 SB	Riverside Avenue	PM	No														56	9,487	0.580	0.761	
2013	I-5 NB	Riverside Avenue	Saturday	No														21	9,487	0.580	0.729	
2011	I-5 NB	Knighton Road	Saturday	No														75	9,487	0.580	0.776	
2009	I-5 NB	Bonnyview Road	Saturday	No														107	9,487	0.580	0.777	
2007	I-5 NB	Cypress Avenue	Saturday	No														413	9,487	0.580	0.770	
2006	I-5 SB	Cypress Avenue	Saturday	No														-107	9,487	0.580	0.803	
2008	I-5 SB	Bonnyview Road	Saturday	No														-139	9,487	0.580	0.792	
2010	I-5 SB	Knighton Road	Saturday	No														-174	9,487	0.580	0.791	
2012	I-5 SB	Riverside Avenue	Saturday	No														-198	9,487	0.580	0.777	
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HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge Ramp Junctions Capacity Analysis** | Jur Analy

General Information **Existing No Project**

ID	Freeway/ Direction	On-ramp	Analysis Time Period	P_{FM}	v_{12} (pcph)
1013	I-5 NB	Riverside Avenue	PM	1.000	2,060
1011	I-5 NB	Knighton Road	PM	1.000	2,127
1009	I-5 NB	Bonnyview Road	PM	1.000	1,936
1007	I-5 NB	Cypress Avenue	PM	1.000	2,203
1006	I-5 SB	Cypress Avenue	PM	1.000	2,219
1008	I-5 SB	Bonnyview Road	PM	1.000	2,247
1010	I-5 SB	Knighton Road	PM	1.000	2,580
1012	I-5 SB	Riverside Avenue	PM	1.000	2,415
2013	I-5 NB	Riverside Avenue	Saturday	1.000	2,154
2011	I-5 NB	Knighton Road	Saturday	1.000	2,527
2009	I-5 NB	Bonnyview Road	Saturday	1.000	2,406
2007	I-5 NB	Cypress Avenue	Saturday	1.000	2,829
2006	I-5 SB	Cypress Avenue	Saturday	1.000	1,703
2008	I-5 SB	Bonnyview Road	Saturday	1.000	1,423
2010	I-5 SB	Knighton Road	Saturday	1.000	1,596
2012	I-5 SB	Riverside Avenue	Saturday	1.000	1,402

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

General Information **Existing No Project** | *Capacity Checks*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	v_{Fi} (pcph)	Max v_{Fi} (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	2,060	4,500	No	2,352	4,500	No	0	No	No	2,060	2,352	4,600	No	292	2,000	No
1011	I-5 NB	Knighton Road	PM	2,127	4,500	No	2,409	4,500	No	0	No	No	2,127	2,409	4,600	No	282	2,000	No
1009	I-5 NB	Bonnyview Road	PM	1,936	4,500	No	2,640	4,500	No	0	No	No	1,936	2,640	4,600	No	704	2,000	No
1007	I-5 NB	Cypress Avenue	PM	2,203	4,500	No	3,577	4,500	No	0	No	No	2,203	3,577	4,600	No	1,374	2,000	No
1006	I-5 SB	Cypress Avenue	PM	2,219	4,500	No	2,898	4,500	No	0	No	No	2,219	2,898	4,600	No	679	2,000	No
1008	I-5 SB	Bonnyview Road	PM	2,247	4,500	No	2,857	4,500	No	0	No	No	2,247	2,857	4,600	No	609	2,000	No
1010	I-5 SB	Knighton Road	PM	2,580	4,500	No	2,746	4,500	No	0	No	No	2,580	2,746	4,600	No	165	2,000	No
1012	I-5 SB	Riverside Avenue	PM	2,415	4,500	No	2,725	4,500	No	0	No	No	2,415	2,725	4,600	No	310	2,000	No
2013	I-5 NB	Riverside Avenue	Saturday	2,154	4,500	No	2,565	4,500	No	0	No	No	2,154	2,565	4,600	No	411	2,000	No
2011	I-5 NB	Knighton Road	Saturday	2,527	4,500	No	2,816	4,500	No	0	No	No	2,527	2,816	4,600	No	289	2,000	No
2009	I-5 NB	Bonnyview Road	Saturday	2,406	4,500	No	2,966	4,500	No	0	No	No	2,406	2,966	4,600	No	560	2,000	No
2007	I-5 NB	Cypress Avenue	Saturday	2,829	4,500	No	4,393	4,500	No	0	No	No	2,829	4,393	4,600	No	1,564	2,000	No
2006	I-5 SB	Cypress Avenue	Saturday	1,703	4,500	No	1,965	4,500	No	0	No	No	1,703	1,965	4,600	No	263	2,000	No
2008	I-5 SB	Bonnyview Road	Saturday	1,423	4,500	No	1,817	4,500	No	0	No	No	1,423	1,817	4,600	No	394	2,000	No
2010	I-5 SB	Knighton Road	Saturday	1,596	4,500	No	1,653	4,500	No	0	No	No	1,596	1,653	4,600	No	57	2,000	No
2012	I-5 SB	Riverside Avenue	Saturday	1,402	4,500	No	1,538	4,500	No	0	No	No	1,402	1,538	4,600	No	137	2,000	No

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

General Information **Existing No Project** *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	**23.1**	**C**	0.355	14.9	0.0	14.9
1011	I-5 NB	Knighton Road	PM	**23.5**	**C**	0.357	15.0	0.0	15.0
1009	I-5 NB	Bonnyview Road	PM	**25.1**	**C**	0.369	15.5	0.0	15.5
1007	I-5 NB	Cypress Avenue	PM	**32.1**	**D**	0.453	19.0	0.0	19.0
1006	I-5 SB	Cypress Avenue	PM	**27.1**	**C**	0.385	16.2	0.0	16.2
1008	I-5 SB	Bonnyview Road	PM	**26.8**	**C**	0.382	16.0	0.0	16.0
1010	I-5 SB	Knighton Road	PM	**26.2**	**C**	0.375	15.7	0.0	15.7
1012	I-5 SB	Riverside Avenue	PM	**26.0**	**C**	0.374	15.7	0.0	15.7
2013	I-5 NB	Riverside Avenue	Saturday	**24.7**	**C**	0.365	15.3	0.0	15.3
2011	I-5 NB	Knighton Road	Saturday	**26.7**	**C**	0.379	15.9	0.0	15.9
2009	I-5 NB	Bonnyview Road	Saturday	**27.7**	**C**	0.390	16.4	0.0	16.4
2007	I-5 NB	Cypress Avenue	Saturday	**38.4**	**E**	0.629	26.4	0.0	26.4
2006	I-5 SB	Cypress Avenue	Saturday	**20.1**	**C**	0.342	14.4	0.0	14.4
2008	I-5 SB	Bonnyview Road	Saturday	**18.8**	**B**	0.338	14.2	0.0	14.2
2010	I-5 SB	Knighton Road	Saturday	**17.7**	**B**	0.334	14.0	0.0	14.0
2012	I-5 SB	Riverside Avenue	Saturday	**16.8**	**B**	0.332	14.0	0.0	14.0

HCM 2000 HCM 2000
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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 No Project**

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	2	0	1986	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,267
1011	I-5 NB	Knighton Road	PM	2	0	2061	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,352
1009	I-5 NB	Bonnyview Road	PM	2	0	2111	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,409
1007	I-5 NB	Cypress Avenue	PM	2	0	2313	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,640
1006	I-5 SB	Cypress Avenue	PM	2	0	2739	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,126
1008	I-5 SB	Bonnyview Road	PM	2	0	2539	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,898
1010	I-5 SB	Knighton Road	PM	2	0	2503	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,857
1012	I-5 SB	Riverside Avenue	PM	2	0	2406	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,746
2013	I-5 NB	Riverside Avenue	Saturday	2	0	1987	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,268
2011	I-5 NB	Knighton Road	Saturday	2	0	2247	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,565
2009	I-5 NB	Bonnyview Road	Saturday	2	0	2467	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,816
2007	I-5 NB	Cypress Avenue	Saturday	2	0	2599	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,966
2006	I-5 SB	Cypress Avenue	Saturday	2	0	2092	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,388
2008	I-5 SB	Bonnyview Road	Saturday	2	0	1722	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	1,965
2010	I-5 SB	Knighton Road	Saturday	2	0	1592	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	1,817
2012	I-5 SB	Riverside Avenue	Saturday	2	0	1448	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	1,653

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

General Information **Existing No Project**

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Effective Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	2,267
1011	I-5 NB	Knighton Road	PM	2,352
1009	I-5 NB	Bonnyview Road	PM	2,409
1007	I-5 NB	Cypress Avenue	PM	2,640
1006	I-5 SB	Cypress Avenue	PM	3,126
1008	I-5 SB	Bonnyview Road	PM	2,898
1010	I-5 SB	Knighton Road	PM	2,857
1012	I-5 SB	Riverside Avenue	PM	2,746
2013	I-5 NB	Riverside Avenue	Saturday	2,268
2011	I-5 NB	Knighton Road	Saturday	2,565
2009	I-5 NB	Bonnyview Road	Saturday	2,816
2007	I-5 NB	Cypress Avenue	Saturday	2,966
2006	I-5 SB	Cypress Avenue	Saturday	2,388
2008	I-5 SB	Bonnyview Road	Saturday	1,965
2010	I-5 SB	Knighton Road	Saturday	1,817
2012	I-5 SB	Riverside Avenue	Saturday	1,653

General Information **Existing No Project**

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)
				Off-Ramp Data							*Off-Ramp Volume Adjustment*										
1013	I-5 NB	Riverside Avenue	PM	Right	1	45.0	181	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	207
1011	I-5 NB	Knighton Road	PM	Right	1	45.0	197	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	225
1009	I-5 NB	Bonnyview Road	PM	Right	1	45.0	415	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	474
1007	I-5 NB	Cypress Avenue	PM	Right	1	45.0	383	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	437
1006	I-5 SB	Cypress Avenue	PM	Right	1	45.0	795	100	0	100	0.92	Level			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			10.0%	0.0%	1.5	1.2	0.95	1.00	651
1010	I-5 SB	Knighton Road	PM	Right	1	45.0	242	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	276
1012	I-5 SB	Riverside Avenue	PM	Right	1	45.0	290	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	331
2013	I-5 NB	Riverside Avenue	Saturday	Right	1	45.0	100	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	114
2011	I-5 NB	Knighton Road	Saturday	Right	1	45.0	33	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	38
2009	I-5 NB	Bonnyview Road	Saturday	Right	1	45.0	359	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	410
2007	I-5 NB	Cypress Avenue	Saturday	Right	1	45.0	120	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	137
2006	I-5 SB	Cypress Avenue	Saturday	Right	1	45.0	600	100	0	100	0.92	Level			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			10.0%	0.0%	1.5	1.2	0.95	1.00	542
2010	I-5 SB	Knighton Road	Saturday	Right	1	45.0	194	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	221
2012	I-5 SB	Riverside Avenue	Saturday	Right	1	45.0	220	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	251

General Information **Existing No Project** *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													
1011	I-5 NB	Knighton Road	PM	No													
1009	I-5 NB	Bonnyview Road	PM	No													
1007	I-5 NB	Cypress Avenue	PM	No													
1006	I-5 SB	Cypress Avenue	PM	No													
1008	I-5 SB	Bonnyview Road	PM	No													
1010	I-5 SB	Knighton Road	PM	No													
1012	I-5 SB	Riverside Avenue	PM	No													
2013	I-5 NB	Riverside Avenue	Saturday	No													
2011	I-5 NB	Knighton Road	Saturday	No													
2009	I-5 NB	Bonnyview Road	Saturday	No													
2007	I-5 NB	Cypress Avenue	Saturday	No													
2006	I-5 SB	Cypress Avenue	Saturday	No													
2008	I-5 SB	Bonnyview Road	Saturday	No													
2010	I-5 SB	Knighton Road	Saturday	No													
2012	I-5 SB	Riverside Avenue	Saturday	No													

General Information **Existing No Project**

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	256	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,312	1,140	1.000
1011	I-5 NB	Knighton Road	PM	On	1,400	247	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,283	1,151	1.000
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	6,311	1,271	1.000
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	5,794	1,262	1.000
1006	I-5 SB	Cypress Avenue	PM	On	1,650	595	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	7,718	1,596	1.000
1008	I-5 SB	Bonnyview Road	PM	On	1,450	534	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	6,469	1,397	1.000
1010	I-5 SB	Knighton Road	PM	On	1,400	145	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,932	1,193	1.000
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	5,235	1,214	1.000
2013	I-5 NB	Riverside Avenue	Saturday	On	600	360	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,985	1,102	1.000
2011	I-5 NB	Knighton Road	Saturday	On	1,400	253	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,489	1,083	1.000
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	5,455	1,256	1.000
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	4,430	1,136	1.000
2006	I-5 SB	Cypress Avenue	Saturday	On	1,650	230	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	7,725	1,390	1.000
2008	I-5 SB	Bonnyview Road	Saturday	On	1,450	345	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	7,609	1,287	1.000
2010	I-5 SB	Knighton Road	Saturday	On	1,400	50	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,947	1,130	1.000
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	6,346	1,136	1.000

General Information **Existing No Project**

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	v_{12} (pcph)
1013	I-5 NB	Riverside Avenue	PM	2,267
1011	I-5 NB	Knighton Road	PM	2,352
1009	I-5 NB	Bonnyview Road	PM	2,409
1007	I-5 NB	Cypress Avenue	PM	2,640
1006	I-5 SB	Cypress Avenue	PM	3,126
1008	I-5 SB	Bonnyview Road	PM	2,898
1010	I-5 SB	Knighton Road	PM	2,857
1012	I-5 SB	Riverside Avenue	PM	2,746
2013	I-5 NB	Riverside Avenue	Saturday	2,268
2011	I-5 NB	Knighton Road	Saturday	2,565
2009	I-5 NB	Bonnyview Road	Saturday	2,816
2007	I-5 NB	Cypress Avenue	Saturday	2,966
2006	I-5 SB	Cypress Avenue	Saturday	2,388
2008	I-5 SB	Bonnyview Road	Saturday	1,965
2010	I-5 SB	Knighton Road	Saturday	1,817
2012	I-5 SB	Riverside Avenue	Saturday	1,653

General Information **Existing No Project** *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	2,267	4,500	No	0	No	No	2,267	4,400	No	2,060	4,500	No	207	2,100	No
1011	I-5 NB	Knighton Road	PM	2,352	4,500	No	0	No	No	2,352	4,400	No	2,127	4,500	No	225	2,100	No
1009	I-5 NB	Bonnyview Road	PM	2,409	4,500	No	0	No	No	2,409	4,400	No	1,936	4,500	No	474	2,100	No
1007	I-5 NB	Cypress Avenue	PM	2,640	4,500	No	0	No	No	2,640	4,400	No	2,203	4,500	No	437	2,100	No
1006	I-5 SB	Cypress Avenue	PM	3,126	4,500	No	0	No	No	3,126	4,400	No	2,219	4,500	No	907	2,100	No
1008	I-5 SB	Bonnyview Road	PM	2,898	4,500	No	0	No	No	2,898	4,400	No	2,247	4,500	No	651	2,100	No
1010	I-5 SB	Knighton Road	PM	2,857	4,500	No	0	No	No	2,857	4,400	No	2,580	4,500	No	276	2,100	No
1012	I-5 SB	Riverside Avenue	PM	2,746	4,500	No	0	No	No	2,746	4,400	No	2,415	4,500	No	331	2,100	No
2013	I-5 NB	Riverside Avenue	Saturday	2,268	4,500	No	0	No	No	2,268	4,400	No	2,154	4,500	No	114	2,100	No
2011	I-5 NB	Knighton Road	Saturday	2,565	4,500	No	0	No	No	2,565	4,400	No	2,527	4,500	No	38	2,100	No
2009	I-5 NB	Bonnyview Road	Saturday	2,816	4,500	No	0	No	No	2,816	4,400	No	2,406	4,500	No	410	2,100	No
2007	I-5 NB	Cypress Avenue	Saturday	2,966	4,500	No	0	No	No	2,966	4,400	No	2,829	4,500	No	137	2,100	No
2006	I-5 SB	Cypress Avenue	Saturday	2,388	4,500	No	0	No	No	2,388	4,400	No	1,703	4,500	No	685	2,100	No
2008	I-5 SB	Bonnyview Road	Saturday	1,965	4,500	No	0	No	No	1,965	4,400	No	1,423	4,500	No	542	2,100	No
2010	I-5 SB	Knighton Road	Saturday	1,817	4,500	No	0	No	No	1,817	4,400	No	1,596	4,500	No	221	2,100	No
2012	I-5 SB	Riverside Avenue	Saturday	1,653	4,500	No	0	No	No	1,653	4,400	No	1,402	4,500	No	251	2,100	No

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

General Information **Existing No Project** | *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	**22.8**	**C**	0.317	13.3	0.0	13.3
1011	I-5 NB	Knighton Road	PM	**23.6**	**C**	0.318	13.4	0.0	13.4
1009	I-5 NB	Bonnyview Road	PM	**24.1**	**C**	0.341	14.3	0.0	14.3
1007	I-5 NB	Cypress Avenue	PM	**26.1**	**C**	0.337	14.2	0.0	14.2
1006	I-5 SB	Cypress Avenue	PM	**30.2**	**D**	0.380	15.9	0.0	15.9
1008	I-5 SB	Bonnyview Road	PM	**28.3**	**D**	0.357	15.0	0.0	15.0
1010	I-5 SB	Knighton Road	PM	**27.9**	**C**	0.323	13.6	0.0	13.6
1012	I-5 SB	Riverside Avenue	PM	**27.0**	**C**	0.328	13.8	0.0	13.8
2013	I-5 NB	Riverside Avenue	Saturday	**22.9**	**C**	0.308	12.9	0.0	12.9
2011	I-5 NB	Knighton Road	Saturday	**25.4**	**C**	0.301	12.7	0.0	12.7
2009	I-5 NB	Bonnyview Road	Saturday	**27.6**	**C**	0.335	14.1	0.0	14.1
2007	I-5 NB	Cypress Avenue	Saturday	**28.9**	**D**	0.310	13.0	0.0	13.0
2006	I-5 SB	Cypress Avenue	Saturday	**23.9**	**C**	0.360	15.1	0.0	15.1
2008	I-5 SB	Bonnyview Road	Saturday	**20.3**	**C**	0.347	14.6	0.0	14.6
2010	I-5 SB	Knighton Road	Saturday	**19.0**	**B**	0.318	13.4	0.0	13.4
2012	I-5 SB	Riverside Avenue	Saturday	**17.6**	**B**	0.321	13.5	0.0	13.5

Leisch Method for Weaving Analysis

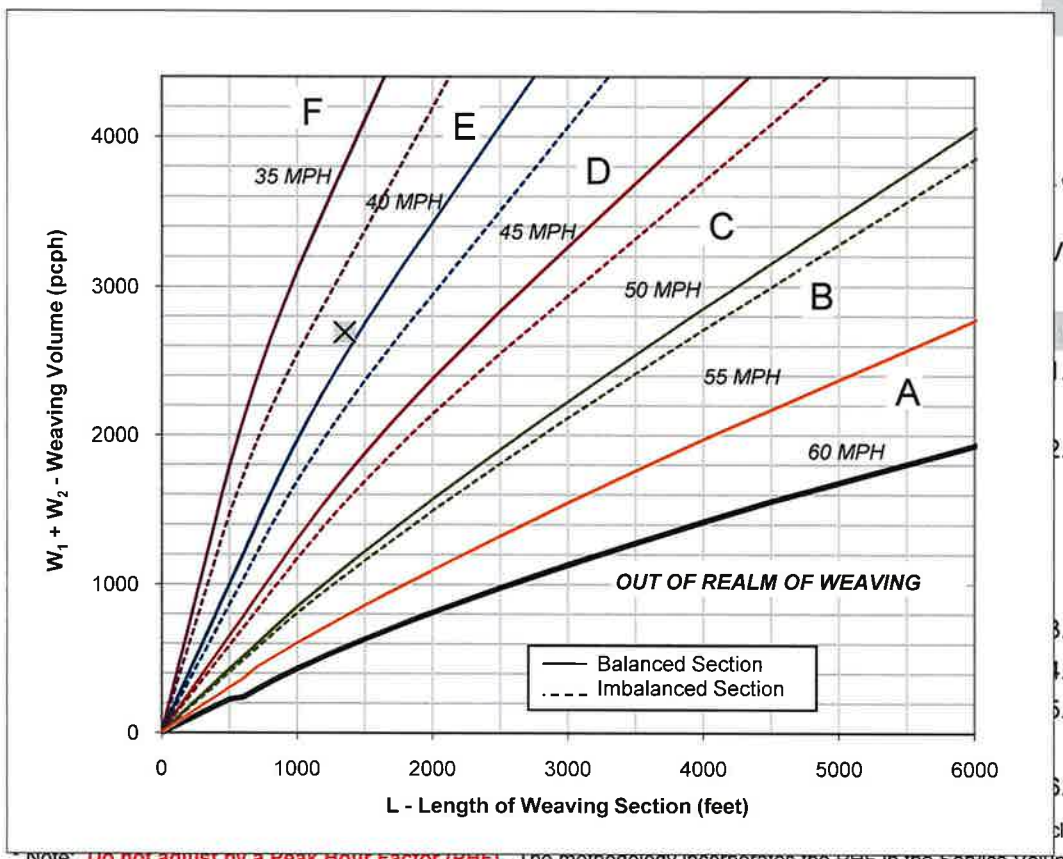
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	1,350

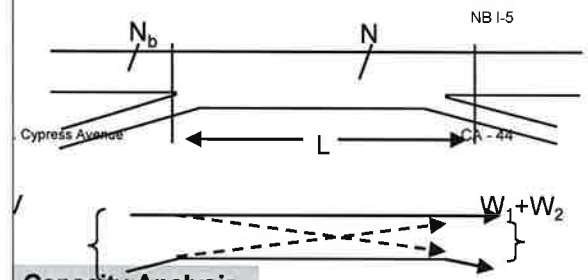
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,849	Volume (vph)*	1,370	Volume (vph)*	1,162
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,234	Volume (pcph)	1,473	Volume (pcph)	1,220

Project Information

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



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?
   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) **32.3**
4. Weaving Intensity Factor (k) **3.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **2,223**
6. Level of Service (LOS) **E**

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

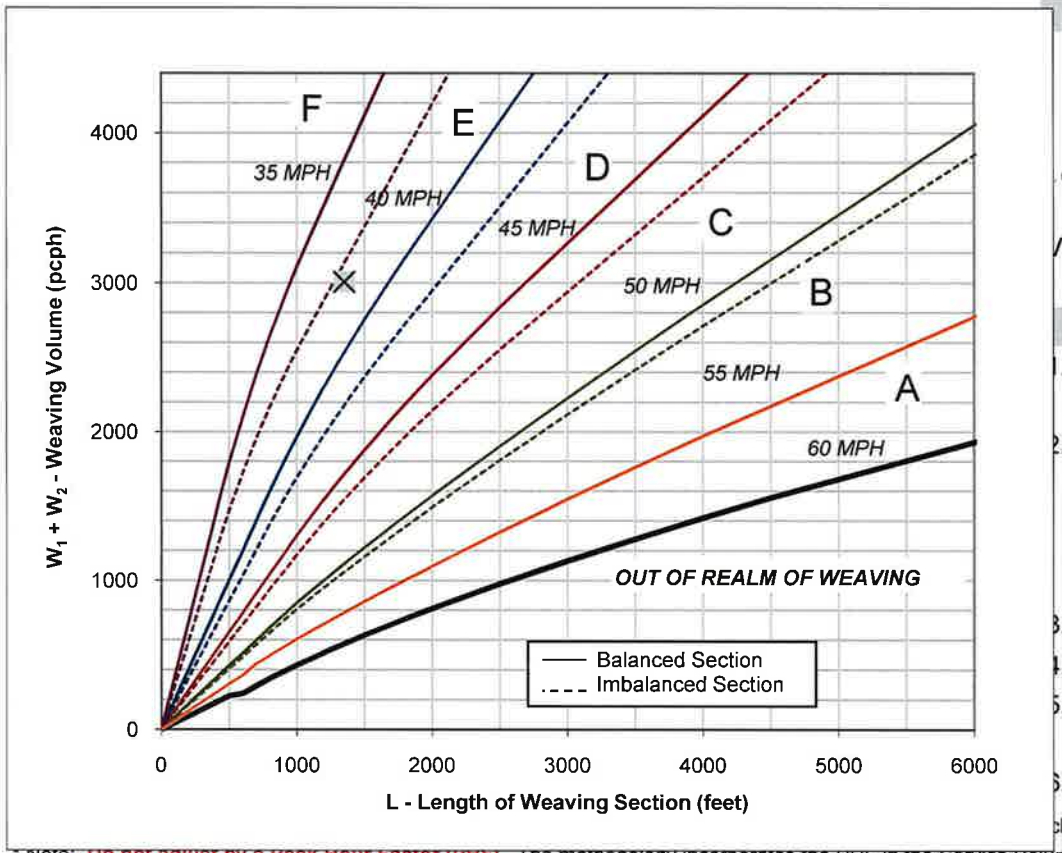
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
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)*	3,134	Volume (vph)*	1,204	Volume (vph)*	1,630
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)	3,447	Volume (pcph)	1,294	Volume (pcph)	1,712

Project Information

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



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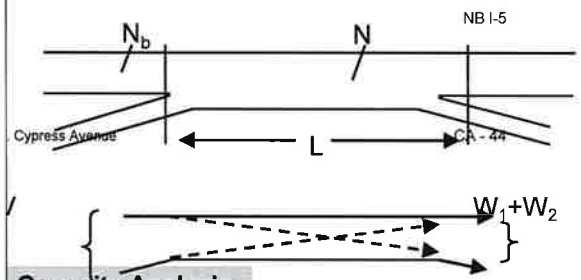


Capacity Analysis

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) **30.6**
4. Weaving Intensity Factor (k) **3.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **2,012**
6. Level of Service (LOS) **E**

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

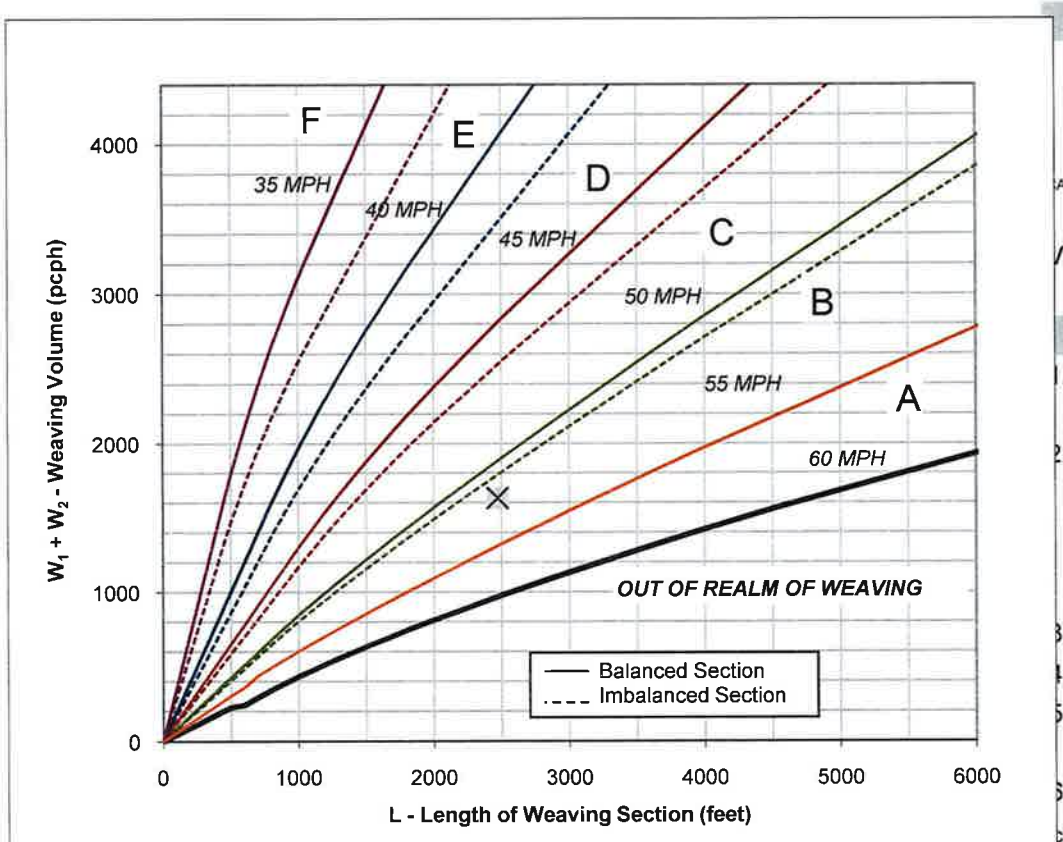
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
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)*	2,739	Volume (vph)*	739	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)	3,013	Volume (pcph)	794	Volume (pcph)	835

Project Information

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



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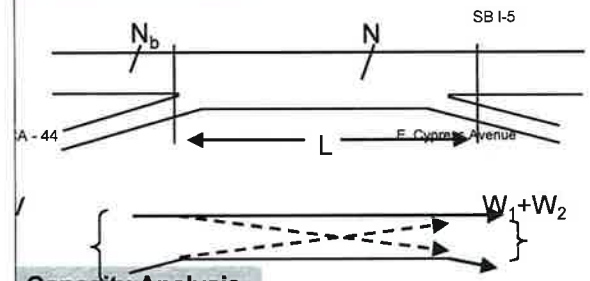


Capacity Analysis

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) **46.6**
4. Weaving Intensity Factor (k) **1.74**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,200**
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

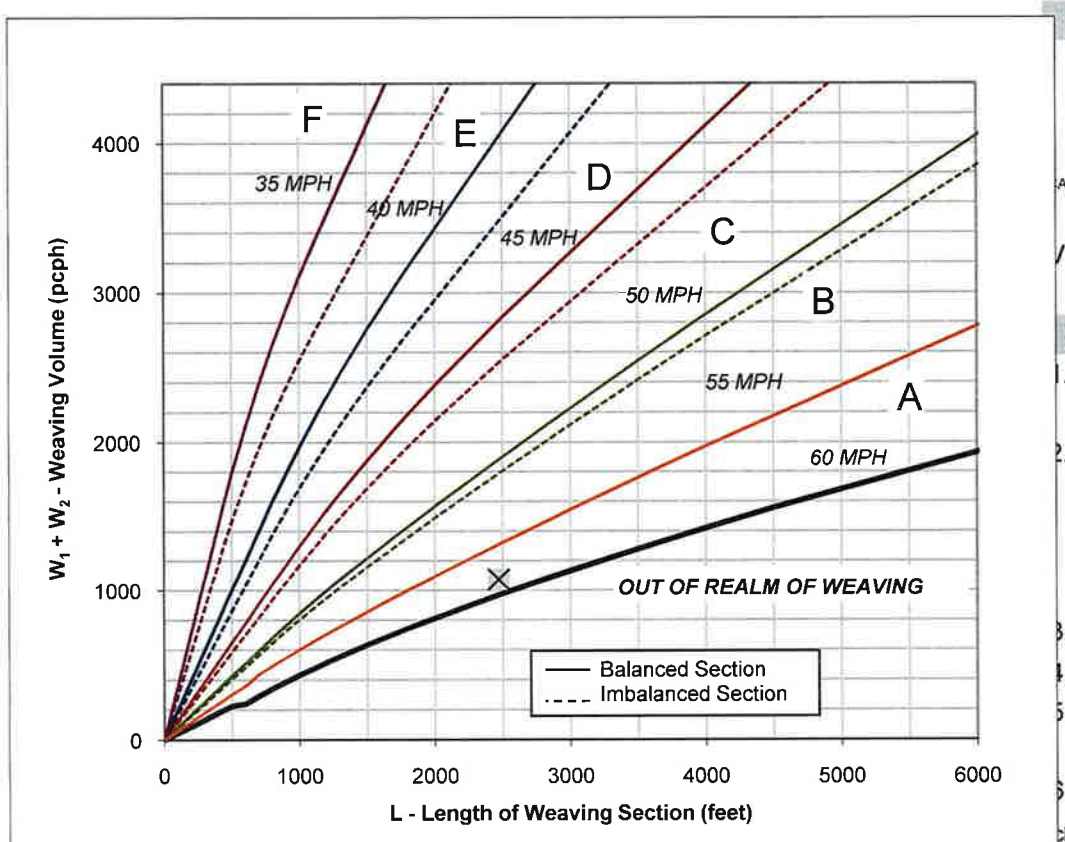
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
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)*	2,092	Volume (vph)*	410	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)	2,301	Volume (pcph)	441	Volume (pcph)	630

Project Information

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



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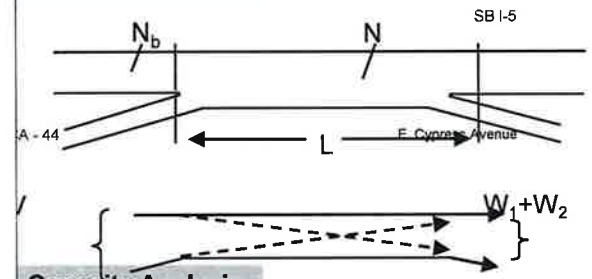

Capacity Analysis

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?
   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) **53.5**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **767**
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.